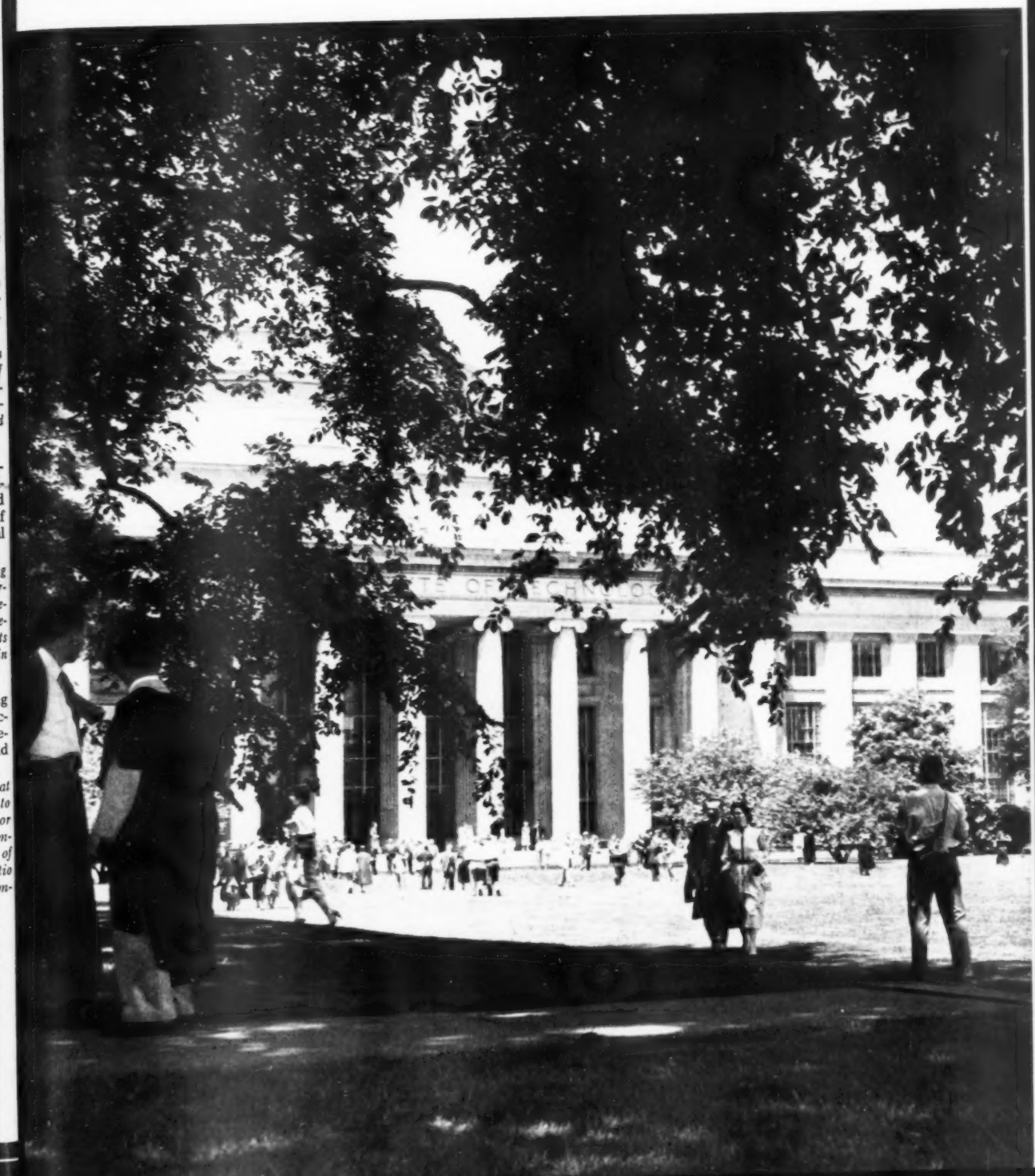
TECHNOLOGY REVIEW

July 1953



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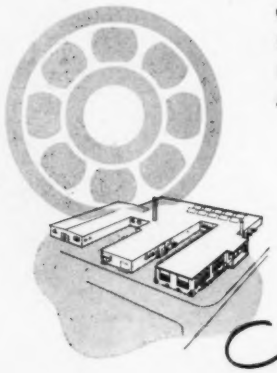

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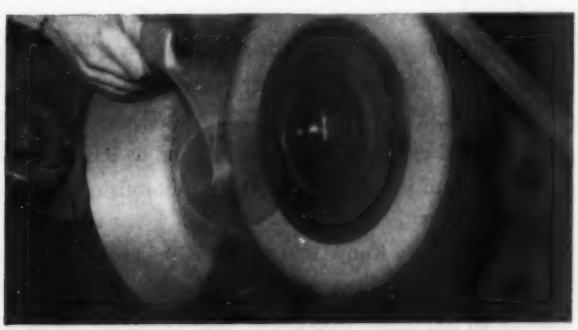
A "Touch of Gold." When a man uses this Norton 6" cylindrical grinding machine equipped with a Norton wheel, high production and precision work result . . . he has the "Touch of Gold."



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NORTON NORTON BEHR-MANNING

THE TECHNOLOGY REVIEW, July, 1953, Newsstand Edition, Vol. LV, No. 9. Published monthly from November to July inclusive at Emmett Street, Bristol, Conn. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription $3.50; Canadian and Foreign subscription $4.00. Entered as second-class matter December 23, 1949, at the Post Office at Bristol, Conn., under the Act of March 3, 1879.

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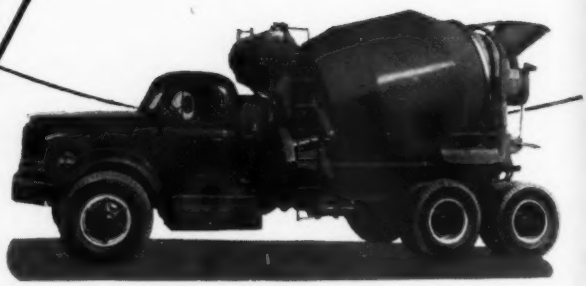

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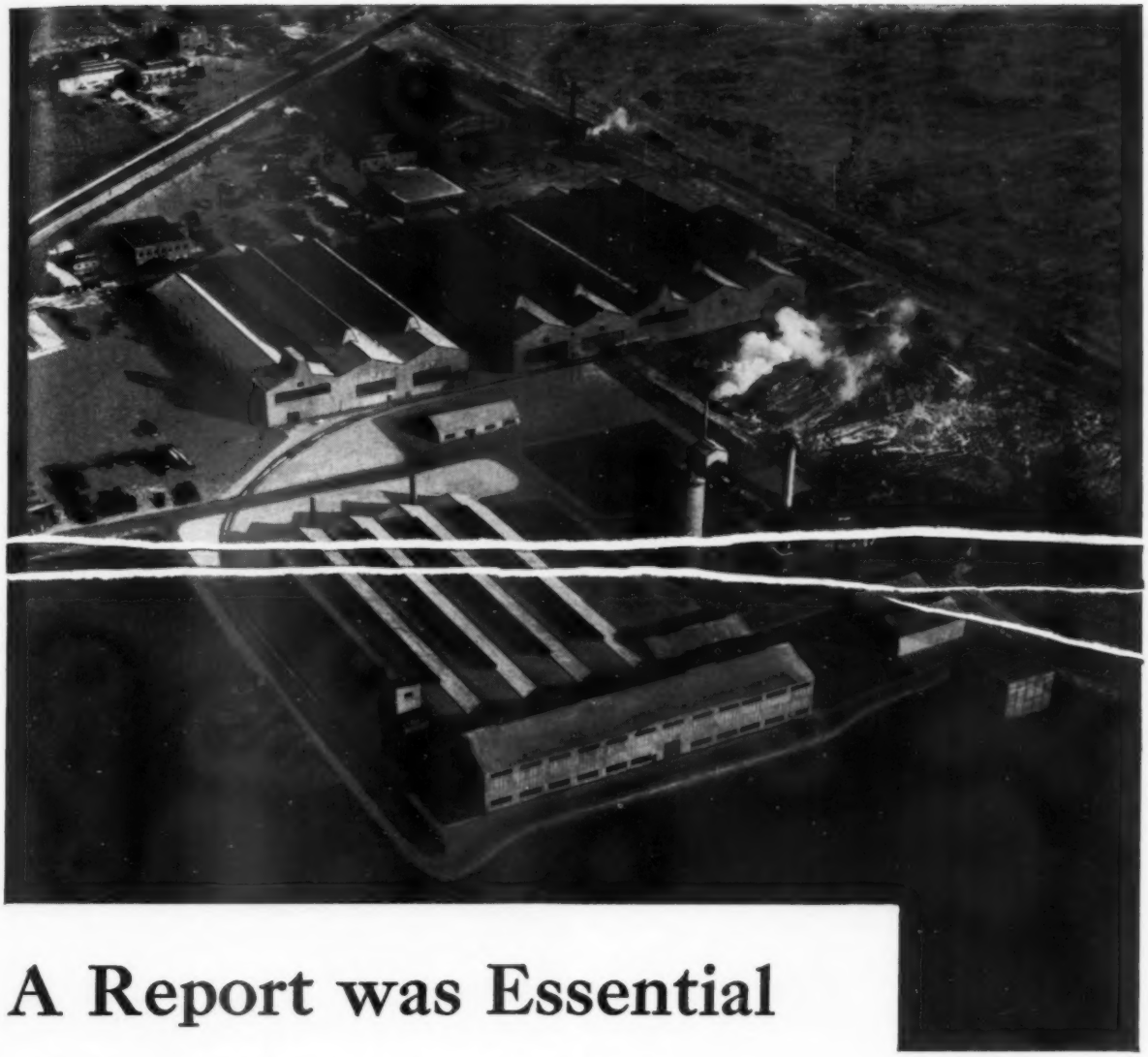

International Graphite & Electrode Division, Speer Carbon Company, Niagara Falls, N. Y.

A Report was Essential

When International Graphite & Electrode Corporation foresaw the need of increased facilities for the manufacture of graphite electrodes, Stone & Webster Engineering Corporation was asked to make a report and recommendations.

The report included a process study, a geographical analysis of product distribution, and a plant site survey which considered both economical distribution and the availability of power and skilled labor.

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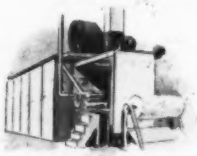
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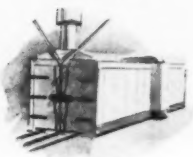
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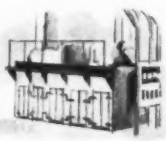
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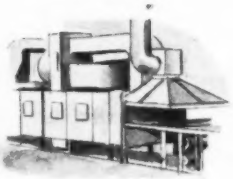
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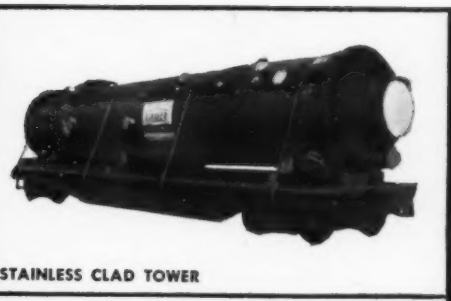
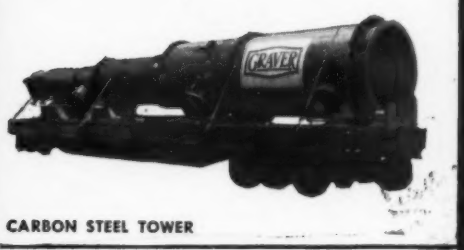
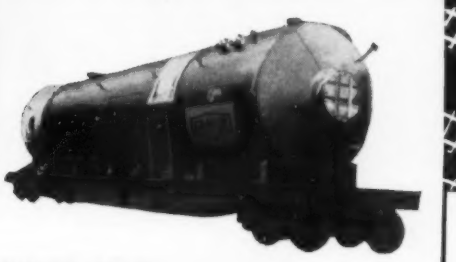


STAINLESS CLAD TOWER



CARBON STEEL TOWER

SOLID STAINLESS TOWER



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UNION OIL COMPANY
OF CALIFORNIA

INCORPORATED IN CALIFORNIA, OCTOBER 17, 1890

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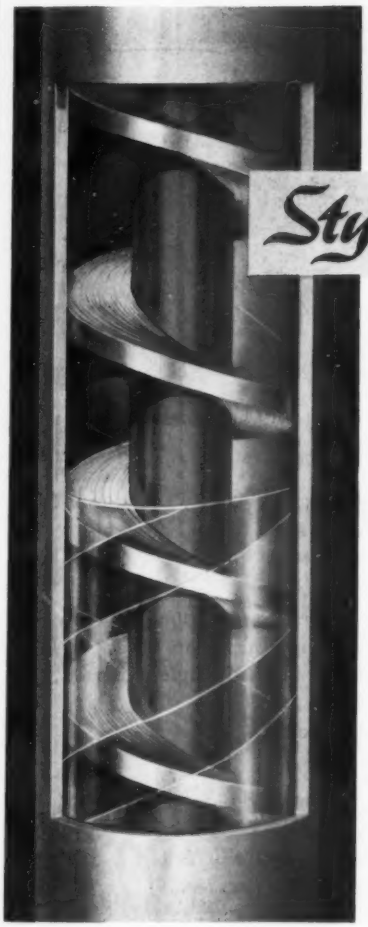

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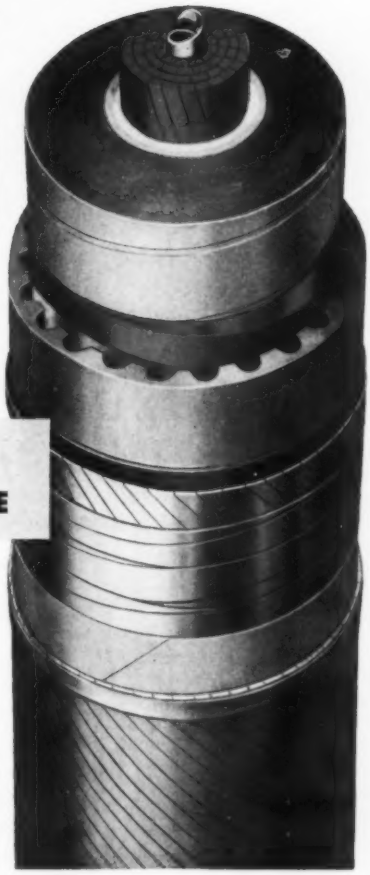

400 KV
OIL-FILLED POWER CABLE

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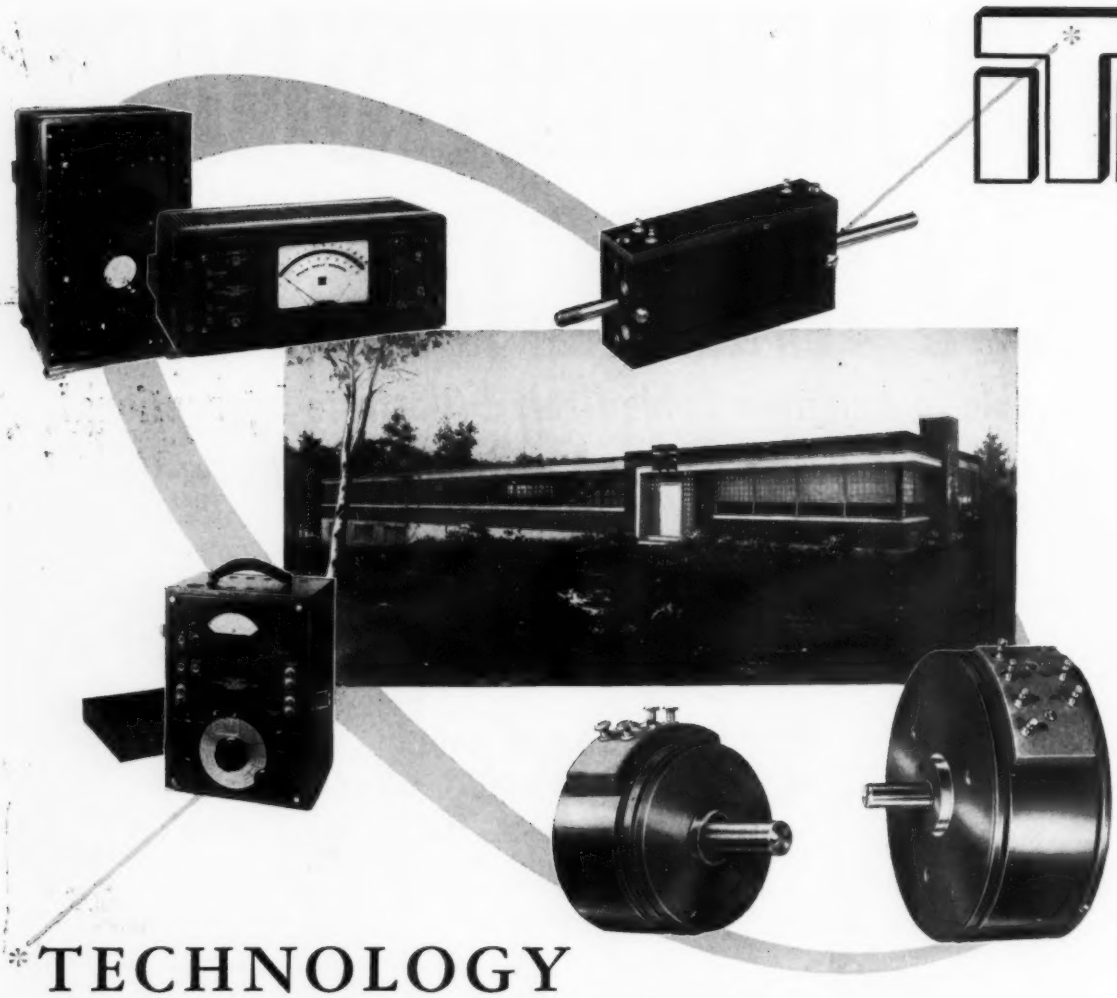

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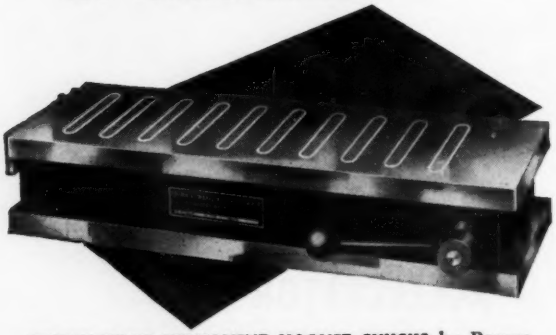

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THE TABULAR VIEW

Baccalaureate Address. — On June 11, members of the Class of 1953 donned caps and gowns in academic procession to Walker Memorial where they listened to the baccalaureate address, delivered by the REVEREND FREDERICK M. MEEK, minister of the Old South Church in Boston, since 1946. Dr. Meek's inspirational message emphasized that the true values and meanings of democracy may easily be lost by allowing secondary aims and auxiliary devices to be treated as primary aims. Dr. Meek's address appears in this issue under the title, "Democracy Is Not Enough" (page 485).

Valedictory Finesse. — In bidding farewell to the Class of 1953 in commencement exercises on June 12, President JAMES R. KILLIAN, JR., '26, took opportunity to call attention to today's unwarranted and deprecating attacks on educational institutions. The only effect which such indiscriminate tactics can have, President Killian reminds us, is to retard the nation in fulfilling its great needs and lofty goals. Under the title, "Our Universities — A Bastion for America," which The Review is pleased to present to its readers (page 489), Dr. Killian urges invigorating support for our educational institutions.

Undergraduate Success. — In delivering the commencement address in Rockwell Cage on June 12, LEWIS W. DOUGLAS, '17, former United States ambassador to the Court of St. James, presented a worldwide view in indirectly commenting on the future careers of those who received degrees. Dr. Douglas told the graduates that impairment of the right to economic freedom ultimately leads to the infringement of freedom of speech and even of worship. As one important means of alleviating the world's economic ills, Dr. Douglas urged in his commencement address (page 491) that free trade be resumed if the world is to be free.

Banquet Lecturers Assess. — With truce negotiations going on while Alumni Day was in progress, a most appropriate topic for the Alumni banquet address was "The Chances for Peace," delivered by ERWIN D. CANHAM, highly experienced and able journalist and editor of the *Christian Science Monitor*. Dr. Canham's assessment of this important problem (page 495) represents an exceedingly broad point of view. Lasting peace, he reaffirms, requires that there must be confidence and respect between nations and peoples of the world, just as there must be between individuals.

Campus Rendezvous Access. — Hundreds of Alumni and their families returned to the Technology campus at the end of the school year to attend commencement exercises, to partake in events of Alumni Day, or to have full access to the campus as reunioning members of the class that left the Institute a quarter century ago. The Review's summary of these events appears in this issue, beginning on page 499. Plentiful illustrations of these important events — representing the work of the M.I.T. Photographic Service — are distributed throughout almost the entire issue.

BEYOND THE HORIZON....

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As stresses and temperatures—such as those used for marine propulsion power plants—increase, it is certain that the alloys which make this possible will rely more and more upon their Molybdenum content.

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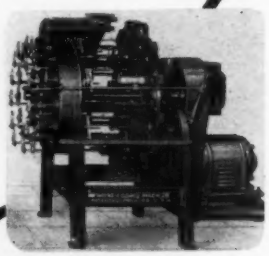

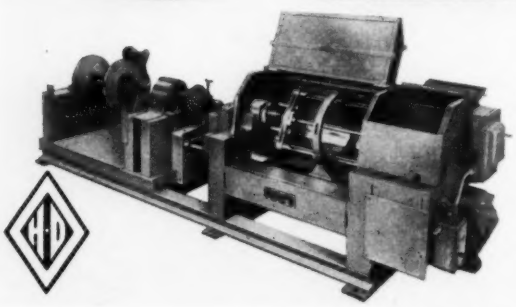

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3. Simple construction; fewer parts make assembly and disassembly easy, mean longer life.
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MAIL RETURNS

Analyzing the April Cover

From Karl R. Kennison, '08:

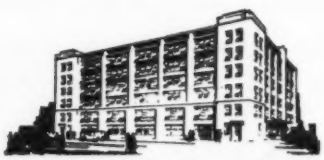
I was very much intrigued by your Professor Edgerton's wonderful photograph of the twirling baton on the cover of your April issue. It occurs to me that this photograph provides an answer to the question: How long is the baton?

The center of gravity of the baton must travel in a parabola from the time it leaves the hand until it is caught. This parabola is precisely determined by the several points at which it is tangent to the baton. The 1/60-second intervals of time are precisely determined by the points at which the various positions of the baton intersect the parabola. Hence one can determine the time of the drop from the top or peak of the parabola to any number of positions that may be selected. In fact greater precision can be obtained by averaging the time of rise and the time of fall. Since this time is directly related to the acceleration due to gravity the scale of the photograph can be found, namely about one 1" = 0.85'. The length of the baton in the photograph varies but this is presumably because the plane of its rotation was not perpendicular to the camera's line of sight. Hence we must use the maximum dimension, namely 3" on the photograph. From this we conclude that the length of the baton was 2' 6½".

New York, N.Y.

(Mr. Kennison's estimate of 30½" compares very well indeed with the measured value of the baton which, Dr. Edgerton advises, is 29 11/16". — Ed.)

The Review is not published during the summer months following July. This issue, therefore, concludes Volume 55. Number 1 of Volume 56 will be published on October 27 and dated November. Readers who bind their copies are reminded that if they possess nine issues of Volume 55, their files are complete. An index to the volume will be ready on September 15 and will be supplied post free upon request.



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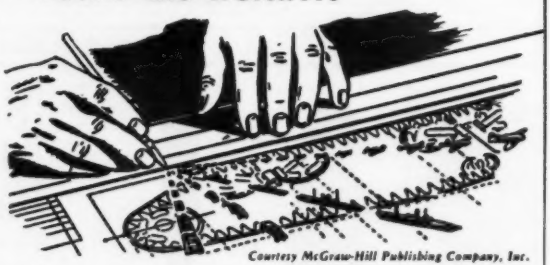

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INDEX TO ADVERTISERS

July, 1953

Advertiser	*Page*
A	
Airtron, Inc.	470
Albert Pipe Supply Company, Inc.	538
Alumni Association Plates	520
Artisan Metal Products, Inc.	466
Ashworth Bros., Inc.	547
Atlantic Gelatin	544
B	
Barbasol Company, The	544
Bardons and Oliver, Inc.	474
W. J. Barney Corporation	468
Barnstead Still and Sterilizer Company	514
Bludworth Marine	547
Boston Gear Works	537
Boston Manufacturers Mutual Fire Insurance Company	521
Box E	522
Box G	542
Brockway Motor Company, Inc.	524
Brown and Sharpe Manufacturing Company	466
C	
Godfrey L. Cabot, Inc.	475
Caldwell-Scott	548
Chance Vought Aircraft	526
Chauncy Hall School	550
Chrysler Corporation	477
Cleverdon, Varney and Pike	551
Clifford Manufacturing Company	515
Climax Molybdenum Company	467
William H. Coburn and Company	526
Combustion Engineering, Inc.	525
Converse Rubber Company	476
J. C. Corrigan Company, Inc.	550
Crandall Dry Dock Engineers, Inc.	550
Curtis Universal Joint Company, Inc.	468
D	
Charles Nelson Debes and Associates	551
Deecy Products Company	538
De Walt, Inc.	540
Dexter Chemical Corporation	547
Diefendorf Gear Corporation	520
Doelcam Corporation	534
James F. Downey	551
Draper Corporation	552
Dwight Building Company, The	549
E	
Eadie, Freund and Campbell	551
Economy Pumps, Inc.	523
F	
Fabric Research Laboratories, Inc.	551
Fairfield and Ellis	539
Fay, Spofford and Thorndike	551
H. E. Fletcher Company	530
Flush-Metal Partition Corporation	Inside Back Cover
G	
Gannett Fleming Corddry and Carpenter, Inc.	547
General Dynamics Corporation	541
General Radio Company	Outside Back Cover
Gilbert Associates, Inc.	551
Goodyear Tire and Rubber Company, The	478
Graver Tank and Manufacturing Company, Inc.	461
H	
Hart Products Corporation, The	518
Haskell-Dawes Machine Company, Inc.	468
Hevi Duty Electric Company	516
Higgins Ink Company, Inc.	470
High Voltage Engineering Corporation	465
Holmes and Narver, Inc.	550
Hydreco	542
J	
Jackson and Moreland	551
Jet-Heet, Inc.	524
K	
Karp Metal Products Company	532
Kohler Company	472
Kuljian Corporation, The	551

(Concluded on page 472)

Page
470
538
520
466
547
544
544
474
468
514
547
537
521
522
542
524
466
475
548
526
550
477
551
515
467
526
525
476
550
550
468
551
538
540
547
520
534
551
552
549
551
523
551
539
551
530
ver
547
541
ver
551
478
461
518
468
516
470
465
550
542
51
24
32
72
51
W

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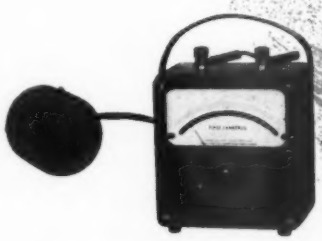

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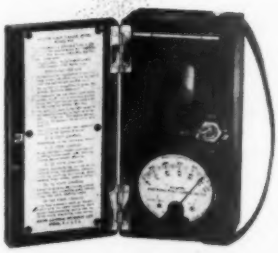

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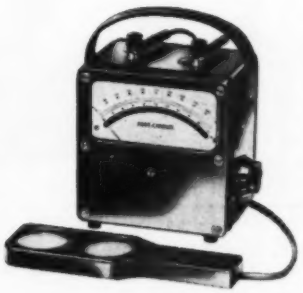

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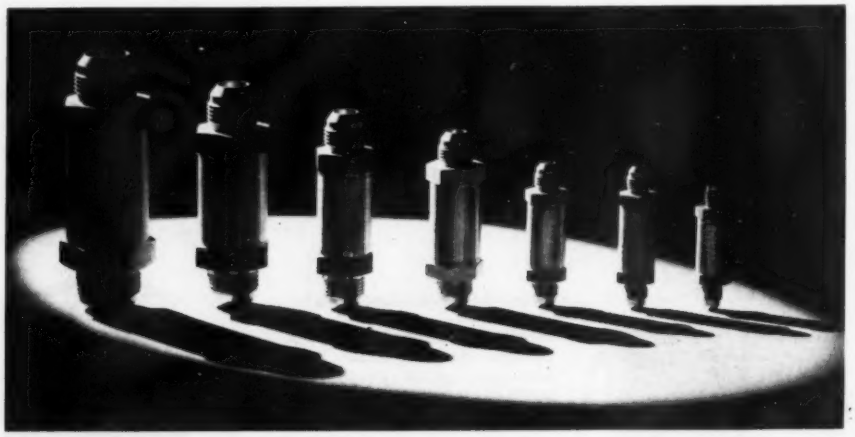
INDEX TO ADVERTISERS

(*Concluded from page 470*)

Advertiser	*Page*
L	
Leonard Construction Company	550
Lewis-Shepard Products, Inc.	528
Liquid Carbonic Corporation, The	542
Lockheed Aircraft Corporation	519
N. A. Lougee and Company	550
M	
Charles A. Maguire and Associates	551
Manufacturers Mutual Fire Insurance Company	527
Frank Massa	551
George W. McCreery Company	548
McDonnell Aircraft Corporation	529
Melpar, Inc.	546
Gerhardt F. Meyne Company	549
Miniature Precision Bearings, Inc.	Inside Front Cover
Moran, Proctor, Mueser and Rutledge	551
Murray Printing Company, The	538
Mutual Boiler and Machinery Insurance Company	521
N	
National Company, Inc.	473
Naugatuck Chemical	533
New London Instrument Company	546
Nicholson Company, The	532
Norton Company	457
P	
Phelps Dodge Copper Products Corporation	463
Plymouth Cordage Company	531
Poor and Company	518
Potter-Horn, Inc.	549
Precision Products Company	534
R	
Radio Corporation of America	543
Raytheon Manufacturing Company	522
Raytheon Manufacturing Company	534
Maurice A. Reidy	551
Reo Motors, Inc.	458
Revere Copper and Brass, Inc.	513
Rome Cable Corporation	517
J. O. Ross Engineering Corporation	460
S	
Scully Signal Company	545
Simplex Wire and Cable Company	469
Sperry Gyroscope Company	535
Standard Oil Company (Indiana)	536
Starkweather Engineering Company, Inc.	551
Stevens-Arnold, Inc.	548
Stone and Webster Engineering Corporation	459
Syska and Hennessy, Inc.	550
T	
Thomas Taylor and Sons	545
Technology Instrument Corporation	464
Tredennick-Billings Company, The	549
U	
Union Oil Company of California	462
V	
Vulcan Chemical Company	528
W	
Weston Electrical Instrument Corporation	471
C. H. Wheeler Manufacturing Company	523

KOHLER PRECISION CONTROLS



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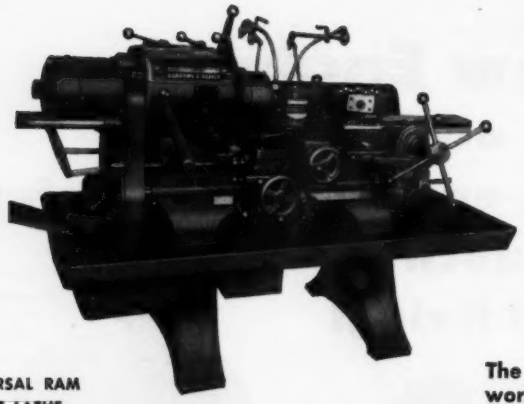

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THE NO. 21 AND NO. 22 SADDLE TYPE TURRET LATHES are exceedingly powerful and rigid for fast production on larger and heavier bar and chucking work. The hydraulic speed preselector, the power traverse to both the cross slide carriage and the saddle, the hydraulic collet chuck and bar feed in combination with many other eminent features make these machines leaders for fast production.

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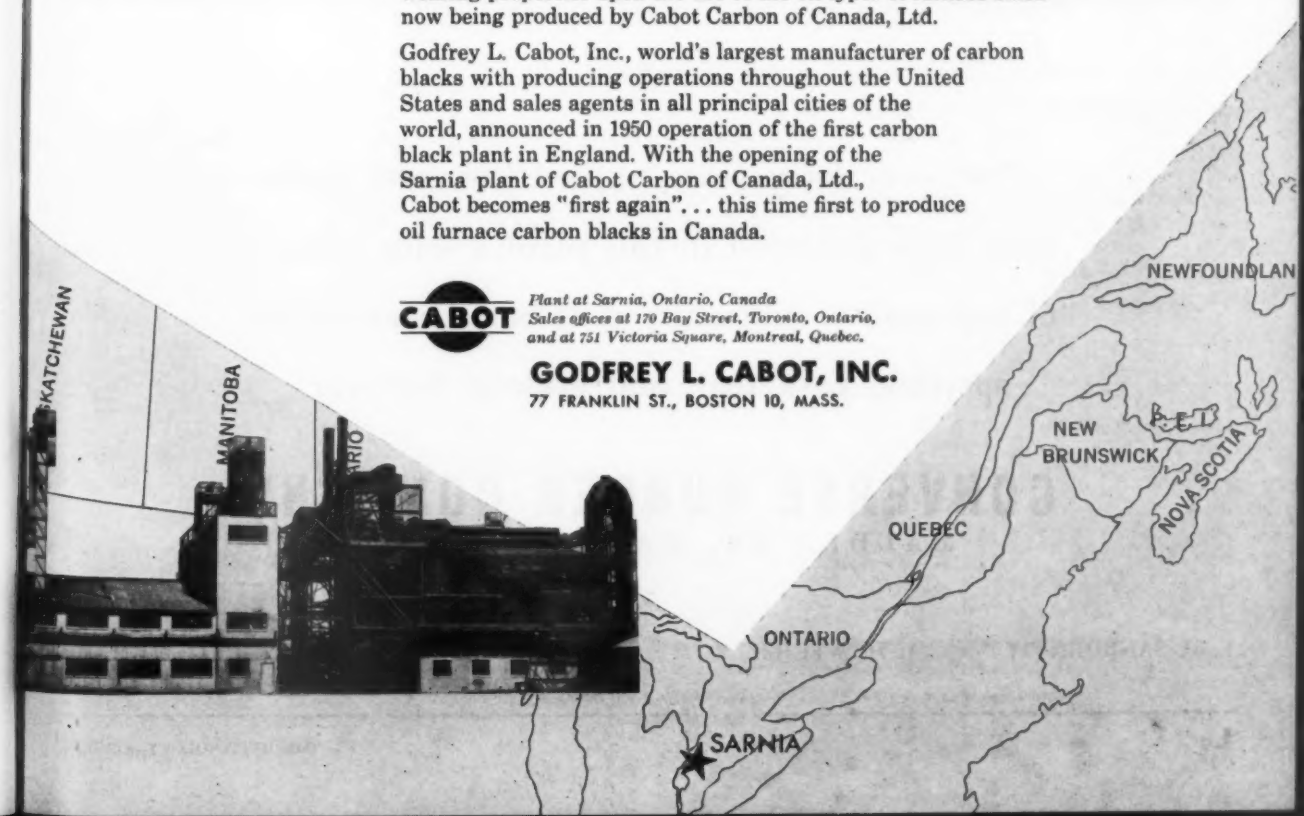
The operation of the Ontario plant will assure a continuous supply of quality oil furnace carbon black for the specific use of Canadian industry. Present carbon black requirements of the rubber industry will be met by the anticipated production of 25,000,000 pounds of carbon black annually, and will be expanded as required to meet the ever-increasing needs of Canadian rubber manufacturers. It is hoped that the continuous supply of oil furnace carbon blacks produced by Cabot Carbon of Canada, Limited will remove for all time the danger of critical short supply of this vital raw material as it existed in Canada during the last war.

Carbon black is a raw material vital to the production of rubber tires and other rubber products . . . an essential component of military vehicle and aircraft tires, tubes and other rubber parts. Synthetic rubber is particularly dependent for its optimum wearing properties upon the use of the oil types of furnace black now being produced by Cabot Carbon of Canada, Ltd.

Godfrey L. Cabot, Inc., world's largest manufacturer of carbon blacks with producing operations throughout the United States and sales agents in all principal cities of the world, announced in 1950 operation of the first carbon black plant in England. With the opening of the Sarnia plant of Cabot Carbon of Canada, Ltd., Cabot becomes "first again". . . this time first to produce oil furnace carbon blacks in Canada.



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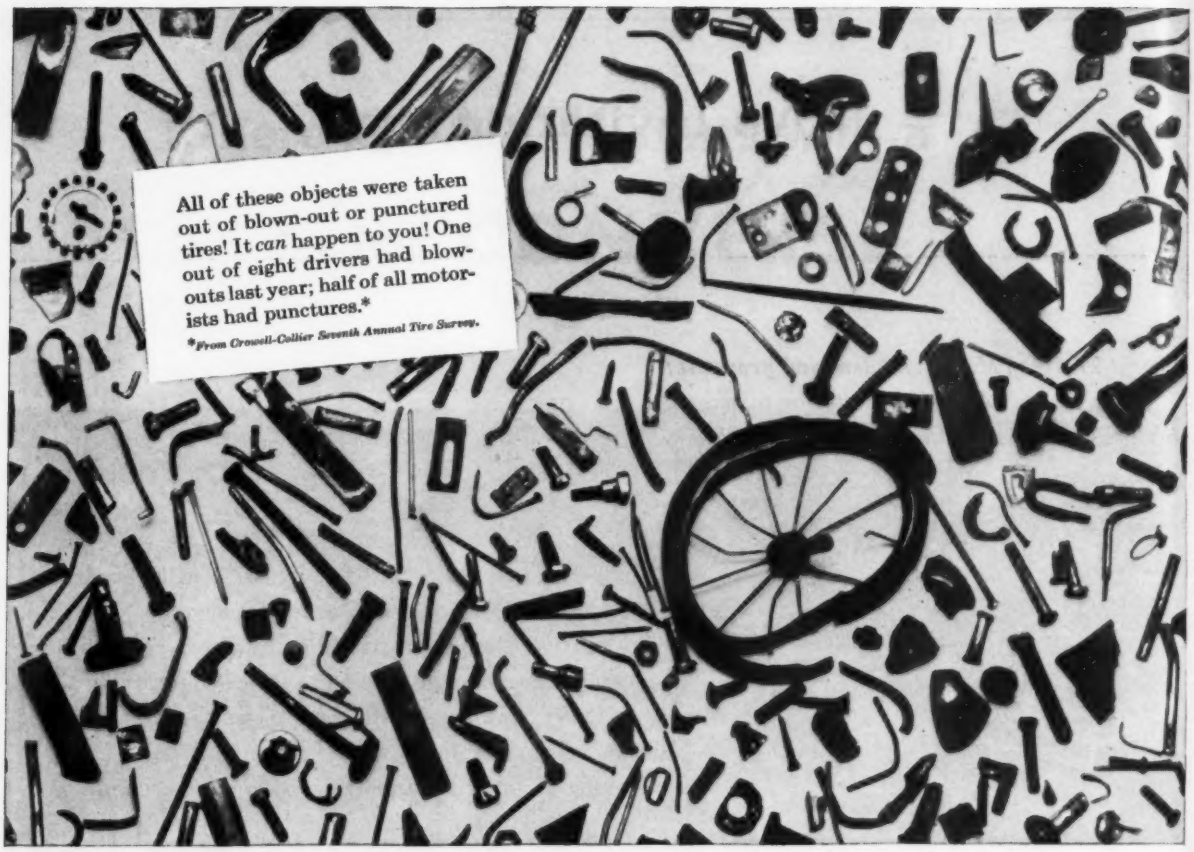
All of these objects were taken out of blown-out or punctured tires! It *can* happen to you! One out of eight drivers had blow-outs last year; half of all motorists had punctures.*
*From Crowell-Collier Seventh Annual Tire Survey.

ALL THESE OBJECTS CAUSED BLOWOUTS OR PUNCTURES!

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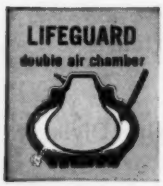

Safe against all blow-outs! When something rips into a single-chamber tire or tube, you can have a blowout that will drop you to the rim in a split second.

But with double-chamber LifeGuards in your tires, you'll still have air in the *second* chamber. You will come to a safe, controlled, straight-line stop. Only the LifeGuard gives blow-out protection proved by 18 years and millions of miles of driving.

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Cost less because they're re-usable! *You save 20% to 43% per wheel!* Because this is the only protection against both blow-outs and punctures that won't wear out when your tires wear out. You spread the cost over 3 or more sets of tires, for 100,000 miles or more. Thus you save 20% to 43% per wheel.

You can use them in your present tires. Or have them installed when you buy your new car. You'll get full value for original equipment tubes. You'll hardly notice the small extra monthly payments.

For the longest mileage, the safest mileage, the most comfortable ride on wheels, remember: More people ride on Goodyear tires than on any other kind. Goodyear, Akron 16, Ohio.

America needs better, safer roads. Let's bring them up to PAR.

NEW LIFEGUARD SAFETY TUBES

by GOODYEAR

LifeGuard, T. M.—The Goodyear Tire & Rubber Company, Akron, Ohio

H. Armstrong Roberts

It is the common fate of the indolent to see their rights become the prey to the active. The condition upon which God hath given liberty to man is eternal vigilance; which condition if he break, servitude is at once the consequence of his crime and the punishment of his guilt.

— John Philpot Curran

THE TECHNOLOGY REVIEW

TITLE REGISTERED, U. S. PATENT OFFICE

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CONTENTS *for July, 1953*

Vol. 55, No. 9

THE GREAT COURT AT M.I.T. AT COMMENCEMENT • *Photograph by M.I.T. Photographic Service* ..... THE COVER

SELECTED EVENTS OF ALUMNI DAY, 1953 • *Photographs by M.I.T. Photographic Service* ..... FRONTISPIECE 480

DEMOCRACY IS NOT ENOUGH ..... BY FREDERICK M. MEEK 485
The baccalaureate sermon emphasizes that democracy's values and true meanings may be lost by allowing secondary aims and auxiliary devices to be treated as primary ends

OUR UNIVERSITIES — A BASTION FOR AMERICA ..... BY JAMES R. KILLIAN, JR. 489
In the valedictory address, Technology's President points out that the deprecating attacks on educational institutions retards the nation in fulfilling its needs and goals

FREE TRADE FOR A FREE WORLD ..... BY LEWIS W. DOUGLAS 491
In the commencement address graduates are told that impairment of right to economic freedom ultimately leads to the infringement of freedom of speech and of worship

THE CHANCES FOR PEACE ..... BY ERWIN D. CANHAM 495
There must be confidence and respect between nations and peoples, just as there must be among individuals, if the world is to have lasting peace

COMMENCEMENT, REUNION, AND ALUMNI DAY, 1953 499
End of the school year brings many Alumni and friends back to Technology to participate in commencement exercises, the 25-year reunion, and events of Alumni Day

THE TABULAR VIEW • Contributors and Contributions 466

MAIL RETURNS • Letters from Review Readers 468

INDEX TO ADVERTISERS • 470

THE TREND OF AFFAIRS • *News of Science and Engineering* 481

THE INSTITUTE GAZETTE • *Relating to the Massachusetts Institute of Technology* 507

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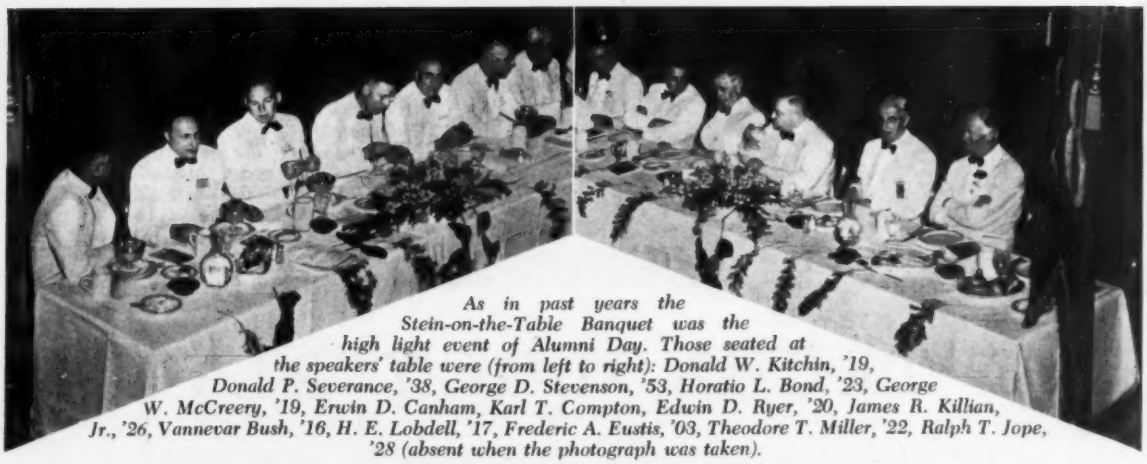
SELECTED EVENTS OF ALUMNI DAY, 1953



As in past years the Stein-on-the-Table Banquet was the high light event of Alumni Day. Those seated at the speakers' table were (from left to right): Donald W. Kitchin, '19, Donald P. Severance, '38, George D. Stevenson, '53, Horatio L. Bond, '23, George W. McCreery, '19, Erwin D. Canham, Karl T. Compton, Edwin D. Ryer, '20, James R. Killian, Jr., '26, Vannevar Bush, '16, H. E. Lobdell, '17, Frederic A. Eustis, '03, Theodore T. Miller, '22, Ralph T. Jope, '28 (absent when the photograph was taken).

Taking part in the dedication ceremonies of the World War II Memorial were (from left to right): John T. Rule, '21, Raymond A. St. Laurent, '21, and Karl T. Compton.

Wallace M. Ross (in dark suit) receives congratulations from George W. McCreery, '19, Mrs. Wallace M. Ross, and Mrs. Robert S. Reebie, daughter of Mr. and Mrs. Ross.

While Alumni attended the Stein-on-the-Table Banquet, the ladies enjoyed their own banquet and address "Sophomores, Slide Rules, and Sophocles," delivered by Profssor Elspeth D. Rostow. Seated at the speakers' table are (above, left to right) Mrs. Donald W. Kitchin, Mrs. George W. McCreery, Mrs. Edwin D. Ryer, Mrs. Karl T. Compton, Professor Rostow, (at right, left to right): Mrs. John B. Wilbur, Mrs. James R. Killian, Jr., Mrs. Erwin D. Canham, Mrs. Horatio L. Bond, Mrs. Frederic A. Eustis, and Mrs. Theodore T. Miller

THE
TECHNOLOGY
REVIEW

Vol. 55, No. 9 July, 1953

The Trend of Affairs

On Continental Defense

In December, 1952, as a part of an over-all review of United States objectives for national security, the then Secretary of Defense, Robert A. Lovett, appointed a special civilian committee* whose duty it would be "to study certain aspects of the problem of defense of the North American Continent against atomic attack, and to make recommendations to assist the Department of Defense in meeting its responsibilities in this area." Secretary Lovett asked the Committee to concern itself primarily with (1) a review of the possibilities of an improved warning system, (2) a study of the relation of such a system to other major Continental defense measures, and (3) the formulation of recommendations on over-all policies and programs to achieve a more effective defense of North America against atomic or other airborne attacks.

The Committee submitted its reports to the Secretary of Defense in May, 1953. The summary report of Dr. M. J. Kelly rephrases, in general terms, the committee's specific conclusions and recommendations for reasons of military security.

The Committee noted that the Soviet Union is militarily capable today of a surprise attack on the United States which could cause large loss of life and major property damage, and possibly temporarily lessen the capability of the United States in a major war effort.

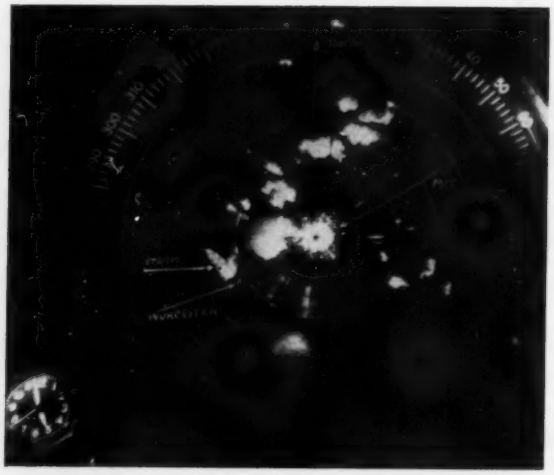
*The membership of the committee included: M. J. Kelly, President, Bell Telephone Laboratories, Chairman; F. L. Hovde, President, Purdue University; S. C. Hollister, Dean of Engineering, Cornell University; D. C. Lauritsen, Professor of Physics, California Institute of Technology; R. E. Wilson, '16, Chairman of the Board, Standard Oil Company of Indiana; A. E. Raymond, '21, Vice-president, Douglas Aircraft Company; Walker Cisler, President, Detroit Edison Company. Representatives of the Army, Navy and Air Force, and of the Weapons Systems Evaluation Group of the Joint Chiefs of Staff, participated in the committee's work as Associate Members. Major General James McCormack, Jr., U.S.A.F., acted as Secretary of the Committee.

Emphasizing that all military measures must be assayed not only as to their value in the event of war but also as to their value in deterring war, the Committee pointed up the importance of continued development of a powerful United States atomic offensive capability, reasonably invulnerable to initial attack, as a vital, major part of the over-all defense system.

"The Committee urged the creation also of a continental air defense system much better than that which is assured under present programs, even though the limitations of known technology and the law of diminishing returns, as applied to national resources committed, may considerably restrict its effectiveness. In this connection the Committee expressed concern about the recent public advocacy of a program which would purportedly give nearly perfect protection against air attack. The Committee held that, so far as can now be foreseen, any such level of protection is unattainable and in any case completely impractical, economically and technically, in the face of expected advances in potentially hostile offensive capabilities. In the light of stern facts, the Committee emphasized that there can be no safety in the atomic age short of the elimination of war.

"After looking closely at the question whether a goal could now be set for a particular desired level of defense against air attack, in the usual terms of costs or target dates, the Committee concluded that a lasting answer on this point cannot be set down at this time. The Committee stated that the definition of such a goal can emerge only as concerted, organized attention is given to the total problem and advancing technology helps solve it. The Committee therefore framed its recommendations to outline a course of action for bringing purpose, vitality, and continuity to the program.

"The Committee found that the complex operations of continental defense against air attack suffer throughout from lack of clean-cut organization. Indi-



Tornado Tracked By Radar

This extraordinary radar photograph shows the violent storm which caused the destructive tornado at Worcester, Mass., on June 9. It was taken at the Weather Radar Research Laboratory operating under the sponsorship of the U. S. Signal Corps at the Massachusetts Institute of Technology in Cambridge, a distance of more than 40 miles from the scene of the storm. The radarscope picked up the storm at approximately 4:58 P.M., EDT, a few minutes before the tornado struck Worcester. The full circle covers a span of 120 miles, each inner circle representing 20-mile spaces. The tornado is hidden in the white patch of the storm, which moved across Worcester in an east-southeasterly direction at a speed of about 40 miles an hour. The other white patches to the right and slightly above the Worcester storm are separate violent thunderstorms. The white dots surrounding M.I.T. in the inner small circle are radar echoes of buildings in Cambridge and Boston.

M.I.T. Weather Radar Research

cating some examples, the Committee recommended close attention to this weakness in the review of Department Defense organization now under way.

"The Committee gave particular attention to a program for improving present means of early warning of the approach of hostile aircraft, as a first essential of an effective active air defense and of a civil defense capable of avoiding a large loss of life. It emphasized also certain necessary improvements in equipment and procedures for intercepting and destroying hostile flights.

"While pointing out the need for constant attention to getting better results from present defensive means, the Committee noted that many of the problems involved in creating an adequate air defense can be answered in the long term only by the application of advancing technology. The Committee urged continuing strong support to a stable and sustained research and development program specifically established for this purpose. The Committee emphasized also the need for streamlining management procedures for research and development, so that there may be necessary flexibility in the face of the ever-changing threat, and maximum advantage may be taken of new scientific knowledge as it evolves.

"The Committee emphasized the mutuality of the defense problem as it effects Canada and the United States, pointing out the necessity for close integration of the defense measures of the two countries. The Committee also noted the connection between the defense of North America and that of other areas, particularly as the early warning network expands.

"The Committee urged an orderly program, directed from the top of the Department of Defense, for bringing about a widespread public understanding of the military aspects of continental defense."

While the above summary is, necessarily, lacking in the detailed recommendations which the Committee made, it is encouraging to know that a study of national defense against the atomic bomb has been made by such an outstanding group of leaders in the field of technology. Readers of *The Review* may derive special satisfaction from the fact that two of the seven members of the study group on continental defense are Technology Alumni.

Tenth Anniversary

ANTIBIOTICS, of which penicillin was the archetype, came into use 10 years ago. Since then they have revolutionized the control of infection in medicine and surgery, thus saving countless lives. Meanwhile another, somewhat surprising, use for antibiotics has become established. This use is the feeding of antibiotics to farm animals to promote growth.

The growth-promoting effect of antibiotics was stumbled on in 1949, when a vitamin concentrate, contaminated with the antibiotic aureomycin, was fed to chicks, and was found to stimulate their growth much more than the pure vitamin alone possibly could. Subsequent experimentation showed similar effects with other antibiotics, and with other animals. As rapid growth is an important economic desideratum in animals raised for food, the feeding of small amounts of penicillin, aureomycin, or terramycin to growing chickens, turkeys, and pigs soon became established.

Antibiotic feeding is still empirical, as the reasons for the growth-promoting effect have not been clearly established despite intensive research. An explanation, postulated but not proved, is that farm animals may ordinarily suffer from low-grade infections or parasitic infestations that delay growth; and that the antibiotics may control such disease.

Another possibility is that the effect is nutritive. This explanation is suggested by experiments showing that antibiotics promote growth only when fed with a ration of inferior nutritive quality. Even if this is the answer, antibiotic feeding could still have economic value, as a cheap ration plus an antibiotic supplement might easily cost less than a more expensive, more nourishing ration.

The results of feeding antibiotics to animals have naturally aroused curiosity as to whether a similar relationship holds true for the human being. One recent study with human subjects used the antibiotic streptomycin. Since gross growth is not a feasible criterion with human subjects, this study employed measurements of nutritive status with respect to specific vitamins of the B complex.

Swallowing streptomycin was found to improve human nutriture with respect to the vitamin folacin.

This finding was postulated to result from an influence of the antibiotic on the bacteria that flourish in the intestinal tract. These intestinal bacteria, it was thought, may pre-empt some of the folacin the human being ordinarily obtains in his food. If such folacin-consuming bacteria were killed off by the antibiotic, more of the dietary folacin naturally would be available to the man. This same theory was extended to explain the results with farm animals, on the basis that folacin is a critical nutritive factor in ordinary farm rations.

When the human studies being cited were extended to the B complex vitamins biotin and niacin, the results were exactly the reverse of those seen with folacin. Swallowing streptomycin was found to worsen nutritive status with respect to biotin and niacin. Intestinal bacteria were again advanced as the explanation. Some of the bacteria that grow in the human intestinal tract are known to generate certain vitamins when grown in cultures in test tubes. If they have a similar action in the intestine, killing them off could make it necessary for the host to consume more of these vitamins with his food, or else suffer a vitamin deficiency.

At this point it becomes clear that the theories explaining nutritive effect of antibiotics by action on intestinal bacteria do not assume that such microbes are wiped out and the gut made sterile. Rather the assumption is that some forms of bacteria are favored, others suppressed. The question is, are such shifts in bacterial population toward the beneficial, or toward the baleful, side?

These explanations are all speculative; but one objective fact emerges. The adverse nutritive effects observed in the feeding of antibiotics to human beings outweighed the favorable effects. Therefore, administration of antibiotics via the human intestinal tract (even local application to mouth or throat infections in such a way that some of the antibiotic may be swallowed) cannot be indiscriminate. Possible adverse nutritive effects must always be considered.

Fatigue and Fracture of Metals

For 5,000 years man has had experience of metal. Considerable though this period is, if judged on an historical rather than on a geological basis, it has proved all too short for the determination of the major chemical and physical characteristics of even that small group of metals used in engineering. This lack of knowledge is particularly conspicuous with regard to the property, now called "fatigue," whose very existence was not recognized in this country until 1849.

One hundred and three years ago a memorable meeting of the Institution of Mechanical Engineers was held in Birmingham. Robert Stephenson presided, and McConnell advanced his explanation of the failure of railway axles. This is equivalent to saying fatigue was accepted as a characteristic of metals subjected to fluctuating loads. In 1950, another meeting was held, this time at the Institute with Jerome Hunsaker, '12, in the Chair. Its purpose, *inter alia*, was to discuss the behavior of metals when subjected to stress variations. Now more than two years after the event, the papers then given, amounting to 14 in all, have been published in book form. This therefore might provide a suitable opportunity for reviewing not only the work* itself, but the progress which has been made in a century of thought and investigation.

When realization of the existence of the fatigue of metals was both novel and confined to the few, there was no agreement as to the physical changes which came about as a result of cyclic stresses. Some, and probably McConnell himself, deceived by the appearance of the characteristic fatigue fracture, thought that the metal had become crystalline, and therefore brittle – the fact that all metals, whether ductile or brittle, are made up of crystals, was not then generally recognized.

Now, more than a century on, what is the answer to the question – "What is fatigue?" In vain one looks for it in this M.I.T. Symposium. This, however, is not a reproach. It is merely a statement of fact. It is true that one of the authors described the fatigue failure of ductile metals as involving localized transitory plastic flow, work-hardening and cracking. This was not debated, but appeared to be generally acceptable, though in the light of recent work of Wood and Head and of Forsyth, it might now be regarded as an oversimplification.

This M.I.T. Symposium consists of 14 papers by authors, mainly American, though two British and one Swede have contributed. Few deal with the fundamental physics of fatigue. Some are concerned with methods of delaying its incidence. There is a paper on the fatigue problem in aircraft structures, another relating to it in ships, another in machinery, and so on. These contributions have merit, and perhaps this is something of an understatement. Their authors, however, regard fatigue as inevitable as death itself, and, in the main, as being equally mysterious; but like the medical practitioner, they believe they know of ways of delaying ultimate dissolution.

For the aircraft engineer concerned more with his specific structural or mechanical problems than with those of metal physics, there is no doubt that there are for him two papers of greater interest than the rest – "The Fatigue Problem in Airplane Structures," by H. L. Dryden, R. V. Rhode, and P. Kuhn (respectively director, assistant director and a member of the Staff of N.A.C.A.), and "A Review of Cumulative Damage in Fatigue," by N. W. Newmark, Research Professor of Structural Engineering, University of Illinois.

The first is a workmanlike exposé of the aircraft fatigue problem as it is, with some indications as to how it is likely to develop. With clarity, the authors state what is known and what is not. Further, they indicate the steps which the N.A.C.A. has taken or is taking to fill the gaps. Truth to tell, the reader will find little in this paper which will be of practical use to him. He will, however, not come to the end of his reading without concluding that the perplexities of fatigue in relation to aircraft are clearly seen by a leader not only with vision, but with the resources necessary for their investigation.

Professor Newmark's judicial review of such evidence as is available to test the veracity of the "Cumu-

*"Fatigue and Fracture of Metals." A Symposium held at the Massachusetts Institute of Technology, June 19-20, 1950. Edited by William M. Murray. (John Wiley & Sons, Inc., New York. Chapman & Hall Ltd., London.)

lative Damage Rule" so attractively enunciated in 1945 by Miner, can be read with interest. Should the reader be able to approach this controversial subject without bias (and in doing this he will be somewhat exceptional) he will surely return a verdict of "not proven."

Finally it can be said of this excellently reproduced symposium that while it contains very little indeed which is new, the authors have given workmanlike reviews of current ideas on those aspects of the fatigue problem with regard to their special knowledge.

Nothing

AMONG the more direct connections between the physics laboratory and the consumer is one that is based on nothing – nothing, that is, but scientific knowledge. If called on to give a few examples of the use of high vacuum in industry, the average layman might mention the electric light, the vacuum tube, and come to a sudden halt. But a host of materials, including such diverse items as metal castings, antibiotics, toys from the five-and-ten cent stores, and various chemicals pass at one stage or another of their production cycle through a high vacuum.

Normally, a high vacuum is one that has been evacuated to about one-millionth the pressure existing under sea-level atmospheric conditions. The specific requirements of a process, however, frequently lead to the use of pressures well removed from this rough datum. The industrial advantages of a vacuum are not always the same. In some cases, it is the virtually complete removal of oxygen that is important. In others, it is the lowering of the temperature of vaporization that is desired – generally, but not always, the boiling point of water.

Under sufficient vacuum, materials can be freed of contained water quickly at room temperatures, and even when frozen solid. The palatability and high-vitamin content of frozen orange juice depends on concentrating the heat-sensitive juice at low temperature and in the absence of air, although economic considerations require that the vacuum be held no "higher" than necessary, and is currently held at about 10 millimeters of mercury. Streptomycin and many other biological products, such as vaccines, are dried under vacuum for similar reasons.

The use of molecular stills to recover vitamins from fish oils, and to produce certain plasticizers and fatty acids has become a good-sized industry, now about 20 years old. Dependent on high volume, high-efficiency vacuum pumps for its existence, it came into being after the development of the molecular pump in 1913 and of the mercury vapor pump in 1916.

One of the more recent fields of application for industrial vacuums is in the deposition of vaporized metallic coatings. Applied in this manner, a wide variety of metals and metallic salts can be made to adhere, in very thin films, to almost any material that can be degassed in the vacuum chamber. Prominent in this list are plastic articles, paper, and even textiles. Although most of the applications have been to base materials that could not be covered by metal in any other way, there is evidence that the process may be competitive, in certain fields, with electroplating, in which metals are deposited on metals.

The coatings are very thin – frequently less than one-hundredth as thick as the thinnest coatings which can be commercially plated – yet are brilliant and lustrous. Thus, material costs, even when evaporating precious metals, can be kept low. The coating can serve as a base for electroplating, if desired. If the casting or molding to be treated does not already have a smooth surface, a coat of lacquer is frequently applied first. After the coating is deposited, another coat of lacquer, clear or tinted, is put on to protect the metallic film from damage or tarnish.

Although every metal and many salts can be vaporized and deposited by this method, aluminum is used in about 95 per cent of the applications. It is low in cost, has a low boiling point, resists tarnishing in air, and is highly reflecting. A pound of vaporized aluminum can cover more than one-half acre of surface.

Another large-volume field is in the refining and sintering of metals which are extremely reactive at elevated temperatures with one or more of the atmospheric gases. During World War II thousands of tons of magnesium were produced by the ferrosilicon process under pressures as low as one micron. Calcium, tantalum, titanium, zirconium, and molybdenum are other metals that are frequently processed under vacuum. Such metals can now be cast in vacuum furnaces which operate continuously. Raw material is charged and cast ingots are removed without cooling the crucible or breaking the vacuum in the melting chamber.

Mysterious MSG

A NEW food seasoning has joined the traditional salt, spices, and herbs in the flavoring of American foods. This novel seasoning bears the sonorous chemical name "monosodium glutamate," but is generally known by its initials, MSG. Although this type of seasoning is fairly new to the Occident, it has long been used by Orientals to enliven their dietaries, which otherwise would be bland in flavor because of containing little animal protein. The chemical basis of MSG and related food seasonings is protein breakdown products – amino acids or peptides – prepared by hydrolyzing proteins, usually those of vegetable origin. The familiar soy sauce that appears on the tables of every Chinese and Japanese restaurant is an example. An Occidental equivalent is the vegetable bouillon cube.

Soy sauce and bouillon cubes are heterogeneous and variable mixtures. Monosodium glutamate, however, is the sodium salt of glutamic acid (an amino acid) in pure crystalline state. It has neither the dark color nor the pronounced aroma of soy sauce or bouillon cubes. MSG is manufactured from protein residues of the wet milling of wheat or corn, or from similar residues from the making of sugar from sugar beets. These vegetable proteins are hydrolyzed, then neutralized, and glutamate is separated from the liquor by crystallization. Washing, centrifuging, drying, and screening then prepare the MSG crystals in a high degree of purity. The entire process is reported to require a month.

(Concluded on page 534)

Democracy Is Not Enough

Our Loyalties Must Reach beyond Manifestations of Material Progress, to the Spirit of Truth, to Belief in Worth of the Individual, to Ideals and Ideas, to Righteousness and Integrity

By FREDERICK M. MEEK

BACCALAUREATE ADDRESS

THE survival of early American settlers depended on reading correctly the signs of the life around them – detecting the often unseen approach of an enemy, on two feet or on four; knowing whether the soil would yield a crop; deciding whether today's spring would still flow, come August; following the tracks of animals needed for food and clothing; reading the sky, whether the morrow would bring sunshine or storm. If the settler read the signs correctly, he and his family survived. If he failed, they perished.

Sometimes the skilled ability to read these external signs was not in itself sufficient. Daniel Boone could read the external signs as well as any one in America. But when a new family settled 50 miles from Daniel's cabin he came home, picked up his gun and said to his wife, "Come on! We're gettin' crowded. We got to be movin'!" In the coming of neighbors, Daniel Boone did not read the signs of a new America – an America greater and more populous than anything he had ever known, an America and a world in which no man could finally escape from his neighbors, nor they from him. What are the signs in our day which are there to be read, and upon whose correct reading our future depends?

It is highly questionable that you and I in our lifetimes will ever know a period of freedom from world tension. Apparently we are to live and do our work in a long-term crisis era, the end of which no one can forecast. Faced with this prospect we seek the deeds and the understanding which will enable us both to survive, and to fulfill our political purpose and our destiny.

We who seek thus to act and to live, are the citizens of a democracy. But our common understanding of what democracy means is far too circumscribed. We are so accustomed to the word "democracy" that we use it almost as a shibboleth; and we confuse its by-products with its true meanings; we confuse the pursuit of our own personal comfort and tranquillity with its primary purpose; we confuse its devices with its inner life.

Democracy is more than a standard of living or a system of free enterprise; it is not simply a method of operating the institutions of government or a technique of voting; it is not a guaranteed freedom (often confused with license) to do as we please. And certainly democracy does not center primarily around military power.

Yet in a democracy we have a profound concern for free elections and for the institutions of government; we are interested in the standard of living and in how it is achieved; and at times democracy calls military power to its aid. But when we allow secondary aims and auxiliary devices to be treated as primary ends, inevitably democracy's values and true meanings are obscured, and may be lost.

Above all else we are enormously concerned with democracy's peril in today's world. And we are lending our efforts on a scale never known before in a so-called "peace-time," to meeting the peril by becoming militarily strong – we need it. I do not argue the necessity or the lack of necessity of military power. But I do affirm that over-absorption with this one kind of defence and with this one kind of

In baccalaureate services held in Walker Memorial, those participating were (left to right): Karl T. Compton, E. Francis Bowditch, Reverend Frederick M. Meek, who gave the baccalaureate sermon, and President James R. Killian, Jr., '26.

potential attack, against those who oppose and bitterly hate our way of life, is a mistake. It is a mistake that could bring us defeat even in the hour when it would bring us a victory of power.

Why do I say this? Because we can never win democracy's victory over those who are opposed to us and our way, simply by pitting power against power. A blow, no matter whether it be delivered by a gun butt or through atomic fission, never destroys an idea; and a victory of military power can never eradicate a false philosophy of life, even through the extermination of the false believers.

Democracy is primarily a way of living based on a particular understanding of the character of life. Democracy has very definite convictions about the meaning of life, centering in man – who he is and who he can be. And democracy's final protection, both offensively and defensively, depends upon the accuracy of the character of this understanding, and upon our devoted commitment to it – both in our understanding – both in our deeds as citizens, and in our witnessing among the nations of men.

Today's great peril comes to focus in a sharp conflict between two very different understandings of the character of life and of man. And the resultant deeds of these differing understandings are meeting, head-on, in the world scene. Our democracy is faced by men who live by passionately held convictions about the impersonal nature of life, and about the impersonal nature of man. Man is regarded as an expendable useful commodity, to be used or discarded with as little personal compunction as is felt in using or discarding any other natural resource – gypsum, steel, or uranium.

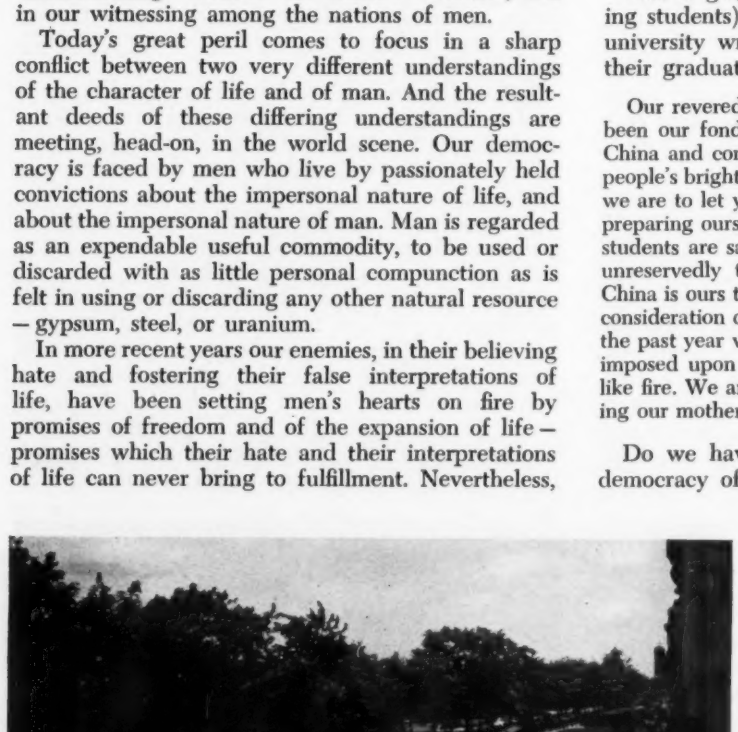
In more recent years our enemies, in their believing hate and fostering their false interpretations of life, have been setting men's hearts on fire by promises of freedom and of the expansion of life – promises which their hate and their interpretations of life can never bring to fulfillment. Nevertheless, more human beings have come under the dominance of these false interpretations of life than have been won to any other interpretation of life in an equal period in the world's history. We are confronted by one of the most aggressive missionary movements in human experience. Therefore, we are faced with initiating and carrying on a sincere believing movement of interpretation of our own way both at home and on a world scale. Our future, for its safety and its fulfillment, lies in ideas, in ideals, and in the dependable character of our understanding of life. And at present, left behind as we are in this current struggle for political and ideational supremacy, we need ever to remember that "A man with an idea, even a false idea, will always beat a man with no idea." Because we have been laying aside our own convictions about *our* Great Idea, we have been losing out. No amount of foreign aid or mercantile exports, or no military might, can ever take the place of our Great Idea.

Not long ago 408 students (most of them engineering students) who were graduating from a Chinese university wrote to Mao Tse Tung on the day of their graduation:

> Our revered and beloved Chairman, Mao: It has long been our fond hope to follow your blueprint of a new China and contribute our share to the realization of the people's bright future . . . That day has come. How happy we are to let you know that we have been studying and preparing ourselves for our glorious tasks. The masses of students are saying we are prepared to devote ourselves unreservedly to the people's great cause. Behold new China is ours today! (Can there therefore be room for the consideration of personal interests and difficulties?) So in the past year we have looked upon our studies as a duty imposed upon us by the people. Our enthusiasm burns like fire. We are thrilled by the prospects of reconstructing our mother country.

Do we have a matching moving loyalty to the democracy of which we are part, so that personal individualistic success is lost sight of in a commanding loyalty to something far greater than ourselves? Certainly we are faced with the necessity of arming ourselves with our own primary convictions and beliefs about our democracy, so that the compulsion of these beliefs will again work their way with us.

The average citizen's devotion and loyalty have been circumscribed into a little front lawn universe, summed up in immature boasting that we have the best of everything, and that "Nobody's going to tell us what to do," all buttressed by statistics about per capita possession of television and bathrooms and automobiles. We have yet to come to terms with the fact that a man's enthusiasms and devotion can and must reach beyond the possession and the lines of a new automobile, or the clarity of the picture that he gets on a 21-inch television screen. I shuddered in fear and in



Members of the graduating class march down Memorial Drive and enter Walker Memorial for the baccalaureate service on June 11.

humiliation this past week, when I contrasted the character of the devotion of those Chinese students with the implication of a sentence spoken seriously in a young valedictorian's address, "Success," said this person, "has taken on for us in America an almost sacred quality." That is, we bow down and worship material achievements. Of all idols, such success is most undependable.

Our most commanding loyalties must reach beyond any manifestation of material progress, to ideals and ideas, to righteousness, and integrity and the spirit of truth. And until these capture our devotion and our loyalty, our way will grow weaker rather than stronger. But such enthusiasms and such loyalties are peculiarly unsuited to today's pressure toward conformity. While democracy exists within the defined limits of freedom, in thought and experience it has not compelled uniformity. Democracy, by its genus, will die when a tight conformity of experience and thought is established, because democracy gives to men a freedom of expression for their lives which is never to be found in the conformists' theories of government and of society. If our democracy is to live, we must make room for the nonconformist, rather than to seek to extinguish his spirit. Actually the only reason why we have our freedoms is because there were nonconformists. The nonconformists brought us our Declaration of Independence, our Bill of Rights, the pattern of our Constitution, our advances in political and social experience.

Meanwhile the pressures toward conformity come from high places and from low. It is assumed by many that if we do not view life through the peephole of some mind which has at its control a raucous voice shouting from behind the shatter-proof glass of Congressional immunity, demanding a surrendering conformity to its peephole view, then we are suspect. But new ideas, fresh ideals, broadened understanding, deeper insights have always come from men who were nonconformists. And in a day of peril when the need for the nonconformist has never been greater, to attempt to wipe out these sources of political and social advance is the most destructive action that can be taken by any group of common citizens or self-constituted leaders.

A Better Tomorrow

This takes us into what some call "dangerous territory." We can never understand democracy, and we can never embody democracy in life and practice, until we understand that at heart democracy is a revolutionary faith. We Americans who were born in a revolution, and who stand in the tradition of the Judeo-Christian faith (the most revolutionary faith mankind knows) have become afraid of the word "revolution." We have let our enemies take the word over and use it for their nefarious purposes, while we have given the appearance (and sometimes the assurance) of being unwilling to assist the seeking millions of the so-called colored races, as they are ready in this century to carry out their own revolutions, which could bring them into the kind of freedom we enjoy. Nothing has tended to destroy faith in democracy more surely than this unwillingness to acknowledge that democracy is always a revolutionary faith, seeking a better tomorrow.

Thus one of the central ideas in democracy, with its emphasis upon freedom and the seeking of truth, is the fact that democracy is never a finally defined way of life. The structure and the way are never complete. It is a sound word that "the present is never good enough to be the final way of life." A democracy that accepts the fact of man's infinite worth, and that provides an arena in which the restless quest at the heart of human life for truth is carried on, can never let itself rest permanently in any present. If in any hour it determined in self-satisfaction never again to move, in that same hour it would be sentencing itself to future extinction. We always have those who, in the name of the highest motives, of course will seek to persuade democracy to share in such a program of political and spiritual suicide.

Thus, consciously or unconsciously, in all that we do, we of a democracy by our living are giving answers to such basic questions as, "What is man?" "What is life?" "How is life to be lived?" But these questions are more than political or economic or social. When the economic and political answers have been given, these same basic questions still remain to be answered, "What is man?" "How is life

Women members of the Class of 1953 who took part in commencement exercises are (in usual reading order): Alice R. Schomburg, Joan M. von Fleckenstein, Janet D. Zachs, Patricia A. Jackson, Carole S. Littlejohn, Ann C. Wilfert.

to be lived?" "What are the purposes of life?" "What is man's worth?" "What are man's rights?" These questions are never answered satisfactorily until an inclusive religious answer has been given, which recognizes not only man and his wants and desires, but also and more important the Creator God and His purposes and His relation to man.

Here we come upon one of democracy's primary convictions, and it is our Great Idea, a belief in the infinite worth of man, and in rights which come to man because he has this worth. This worth which democracy ascribes to man is not something which a state confers upon us men, and which it can, therefore, take away from us when it so desires. Our democracy began with a belief that man's worth and his consequent rights, come to man because he has worth in the sight and purpose of the eternal God. (We forget, today, that some one like Thomas Jefferson believed so profoundly in encouraging this kind of understanding within the rising young democracy, that out of his own private pocket he supported home missionaries to what is now the state of Illinois – a forgotten footnote in the life of Thomas Jefferson.)

This primary belief in the essential dignity and worth of all men has a background which it is very necessary to understand. We do not find this particular belief among the Greeks or the Romans, nor among the Egyptians nor in the Orient. But when we turn to Palestine where the Hebrew and Christian faiths root, there is a striking contrast. This striking contrast is made vivid in an old story from the Book of Kings.

Ahab the King of Israel coveted the vineyard of one of his subjects. He offered to purchase it, but Naboth the owner refused to sell. It was family land, having come down over the generations to him, to his fathers and his forefathers. Thus the King's desire was thwarted. The common man had rights so well recognized that not even the King could step in and override them. And in those days the King was a man with absolute power in the military, the political, and the civil fields. But in that little country of Palestine the monarch's power was restrained by the recognized inalienable rights of the common man.

The King, Ahab, had married a foreign wife, Jezebel. The idea that any citizen, any common man, should have rights which the King could not override was to her, nonsense. Therefore, without consulting Ahab she ordered Naboth to be stoned to death. After the murder she told the King that he could now take possession of Naboth's vineyard, even as he desired. But it was not so simple as that. There was an outburst of public indignation, and in the very hour when the King would have taken possession of Naboth's vineyard, the religious man Elijah, met the King and addressed him in words that in any other land would have brought his death, "Thus saith the Lord, 'Hast thou killed and taken possession? In the place where the dogs licked the blood of Naboth, there shall dogs lick thy blood, O King, even thine.'" The King, hearing the words of Elijah, the servant of God, went home desperately afraid and never laid hands on the land. The records says, "And it came to pass that when Ahab heard these words he rent his clothes, and he put sackcloth upon his flesh and fasted."

It has been accurately pointed out that this story has no parallel in the literature of any other people. Meanwhile this Old Testament theme of the rights and the worth of the common man, and of God in effect guaranteeing them, was part of the inheritance that came into the Christian faith. In the Christian faith there came alive the point of view that human personality mattered in the sight of God more than anything else.

It is this Great Idea of the worth of the individual, coming into our political institutions directly from the Judeo-Christian stream of religious thought and experience, which our enemies oppose so violently. Their system is erected on a belief that a man does not have any such worth or such rights. And when we, in our democracy, attempt to separate our belief in man's worth and his rights from its religious roots, we leave ourselves denuded of what is our greatest protection and guarantee; and eventually we find that there is nothing to prevent men in quest of power treating us as means to be used and manipulated, to be discarded at their

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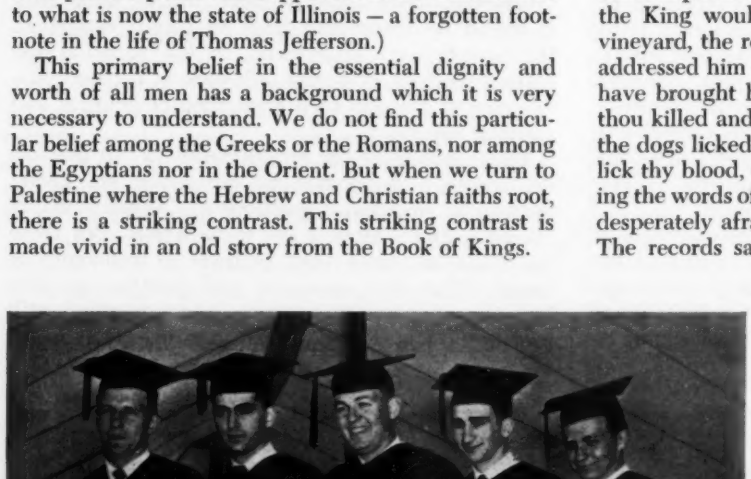


Officers of the Class of 1953 are (left to right): John R. O'Donnell, Second Marshal, George J. Fuld, Third Marshal, George D. Stevenson, President, Mark B. Schupack, First Marshal, Vinson W. Bronson, Jr., Secretary.

Our Universities —

A Bastion for America

The Current Wave of Anti-Intellectualism Retards Us in Fulfilling Our National Needs and Goals

By JAMES R. KILLIAN, JR.

VALEDICTORY ADDRESS

Out of the context of contemporary events and in the spirit of fellowship and ideal aims which mark this institution and our exercises today, I venture to express another hope — a hope that all of us may both encourage and experience a new era of good feeling and good will, an era free of the present miasma of accusation and suspicion, of inquisition and deprecation which today envelops us all.

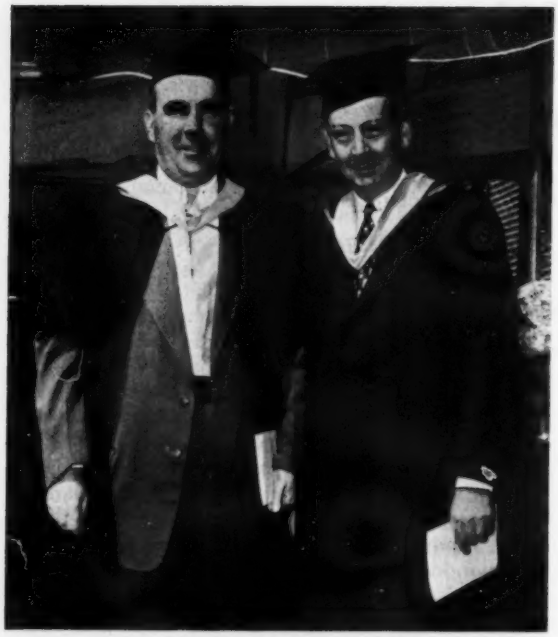
By each of us adding his small increment, we may help to swing the balance. We can help by demonstrating good will ourselves. We can help by embracing every opportunity to high light the need for confidence in each other and our dependence upon each other. We can "accentuate the positive" more and dwell less on the defects and weaknesses of our fellows and our enterprises. We can stress how much, rather than how little, we have reason for pride and confidence in our neighbors and in our institutions. We can insist that building America cannot be achieved by tearing Americans down.

In this spirit of building up rather than tearing down, I speak today about the position of our universities and colleges, stressing not their blemishes but their splendors, not their defects but their achievements. In the 1930's this nation witnessed an enfilading attack on business and on the "economic royalists." In the 1950's we see the attack shifted to education and the "eggheads." These deprecations exhibit a common lack of discrimination and a common search for whipping boys. Both may be characterized as tearing America down rather than building Americans up.

The National Manpower Council, in its recent report to the President, urged that the institutions which train our scientists and our professionals be strengthened and that it be our national policy to create a more favorable climate of opinion for intellectual work and the reward of intellectual achievement. Our nation's defense, our progress, our social and economic well-being depend to a great extent on a handful of specialists and professional men and therefore upon the universities which must educate them.

The current wave of "anti-intellectualism" retards us in fulfilling these national needs and goals. The current spate of inquisitions and special legislation make it more difficult. Their net effect is to dampen creative activity, to accentuate the negative, and to divert attention from the massive corporate loyalty and soundness of our institutions. Certainly there are occasional motes in the academic eye, but they shade into insignificance when we see Alma Mater's wholesome, robust, full-length figure. What we have to fear today is not public scrutiny but the attitude that looks solely for the bad and ignores the overwhelmingly greater part which is good. It is important that this be said and understood. Never have our universities been more productive or carried heavier responsibilities for the nation or yielded a higher return to society or been more of a bastion protecting our American faith. It is important that it be said and understood that out of the laboratories and scholarly activities of our universities is flowing a stream of discoveries and new concepts which continue to improve our health, better our environment, increase

Photographed just prior to commencement exercises are (left to right): Lewis W. Douglas, '17, Archbishop Richard J. Cushing, President James R. Killian, Jr., '26, Karl T. Compton, and Chester A. Higley, Vice-mayor of Boston.



Representing the Class of 1928 in the procession on commencement day are Ralph T. Jope, '28, (left) and George I. Chatfield, '28, President and Secretary respectively.

our productivity, elevate our standard of living, augment our intellectual capital, and perpetuate and strengthen American ideals.

During the next decade or so, our university system must acquire the teachers, the buildings, the equipment, and the funds to educate at least 2,000,000 more students than they are now handling. Already industry is talking of the possibility of doubling the real buying power of the American family in the next quarter century. The universities must educate the experts and do the basic research that it will require. As we seek wisely to exercise our immense international responsibilities, our universities must generate the creative forces, develop the knowledge of foreign peoples, and train the men of scope and vision required for the job. The basic research load of the nation, which means the responsibility for creating its future, is carried largely by 15,000 men and women in our colleges. Fifteen thousand out of 150,000,000! This handful of people are doing superb work and are making American universities one of the glories of Western civilization. Obviously it is not wise to harass them or deflect them from their important tasks which benefit us all; rather should we strive to support them in every way.

For these reasons our universities have never been more in need of the calm understanding and vigorous support of the people they serve or more in need of steadfastness of purpose and principle on the part of the teachers, administrators, and students within the universities themselves. They have never been more in need of building up rather than tearing down. All of these things need to be said and understood. It is my hope that some of the inquisitors will say these things and place them in proper relationship to the minor blemishes they find to criticize.

The current criticism of education also points up responsibilities which must be unflinchingly met by the universities. They must not permit themselves to be infiltrated or corrupted by those who conspire against our government. They must rid themselves of the conspiratorial and unfit, if they ever appear, but they must do so with due process and full observance of civil rights. They have demonstrated in the past that they can do this better than any other agency. Our great universities must be built of many kinds of men, and not of men in the image of any one type. They must be hospitable to the man who has the courage to be different, provided he has the gift to be wise. They also must defend the man who has the courage to conform, provided he has the gift of being creative. They must avoid authoritarianism, regimentation, and the doctrinaire. Universities corporately must not take sides, except to the basic commitments and ideals of our society. They must not become subject to any outside control, but they must always be responsive to the small voice of individual and social conscience calling for integrity and public responsibility. They must seek always to train their sights on ideal aims. They must maintain a free market of ideas where error or partisanship will be revealed and objectivity and integrity confirmed.

An institution with these characteristics is the sanctuary of the mind that is joyfully free — and the mind that is not free profanes it. An institution such as this is the most inhospitable of all environments to totalitarianism. The searching clarity and interplay of this environment will inevitably wither communism when it injects itself. An educational institution which accepts these responsibilities and possesses these characteristics has the best of all insurance against infiltration. It has a built-in spiritual servomechanism to correct its errors and maintain its aim. This is not a new state of grace; it is a quality long sustained and of definitely proven worth.

All these things need to be said, for people do not always understand the subtle things which make a university a great university. We in education have the responsibility, which we have usually burked, of codifying and explaining the principles and policies which underlie our educational institutions and make them effective.

Far more is involved here than stressing "academic freedom." Academic freedom somehow has come to connote academic privilege, which it is not. What is involved is the formulation, explanation, and protection of those tested means by which a free society most effectively preserves its past, creates its future, and prepares its young people to be its citizens, its experts, and its leaders. We must make it clear that a voluntary association of free scholars pursuing truth freely wherever and however it may be found is the tested way of accomplishing this mission for our society. We must make it clear why a college cannot be managed like a corporation or an army and still be great. It is the responsibility of our strong and stable institutions to demonstrate that this is true and to resist with courage and determination any invasion of their independence and any distortion of their tested procedures.

(*Concluded on page* 536)

Free Trade for a Free World

A Necessary Cementing Influence of the World's Free Nations is Free and Easy Exchange of National Currencies, Combined with Unrestricted Movement of Trade

By LEWIS W. DOUGLAS

COMMENCEMENT ADDRESS

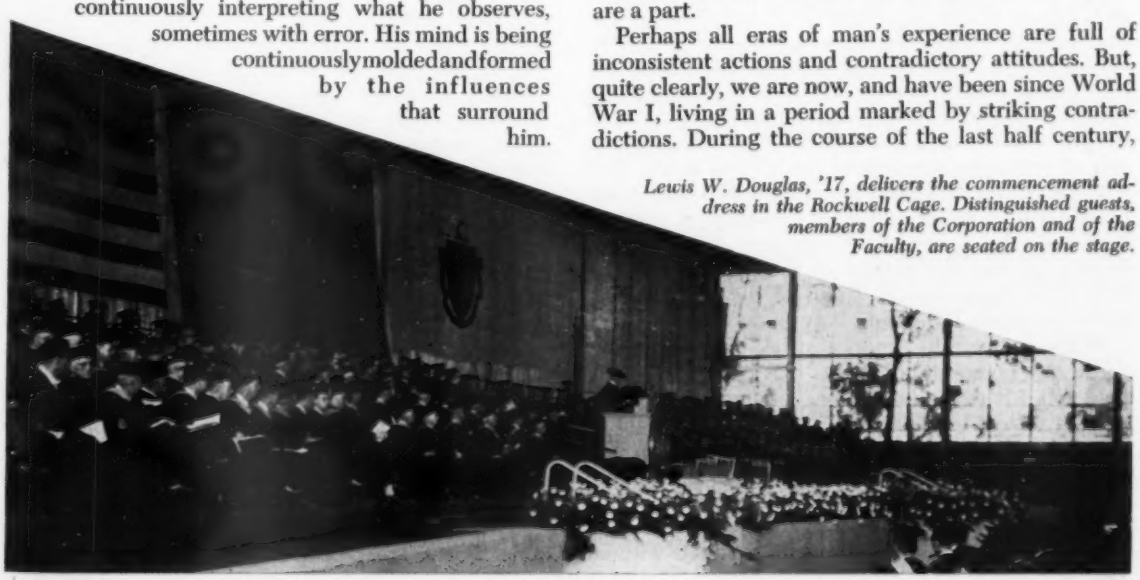
I am grateful to President Killian for inviting me to participate in the commencement exercises of this distinguished center of scientific learning, and for giving me this opportunity to return to the scene of my misspent youth. Here, as a graduate student, I learned much that I have since forgotten. Here my sins of omission and commission inscribed a scarlet record which fortunately was not read by the authorities. Here I did not do many of the things that I should have done, and here I did many of the things I should not have done. Accordingly, I make free and full confession that I am the living evidence which confirms Jefferson's view of some graduates of institutions of learning: "They neither possess knowledge enough to be skilled in the sciences or the arts, nor industry enough to be useful in commerce and trade."

During the long period of time which has intervened between my departure from these halls and my return today, I have learned one important lesson. That portion of our lives that is devoted formally to the acquisition of knowledge in an educational institution comes to an end when we leave behind us the personalities and paraphernalia of the campus. But this does not bring to a close the period in which we learn more about life and human behavior and the nature of the universe itself. For human living is in one sense a continuous process of education. So long as there is life in the human body a person is continuously absorbing the facts of his environment. He is continuously interpreting what he observes, sometimes with error. His mind is being continuously molded and formed by the influences that surround him.

At this point may I make an observation about the difficulty of communicating between my generation and yours. A very considerable span of time separates us. I have lived in a period of history of which you have gained some intellectual view from the books which you have read and the tales which your elders have told you. We use the same language, to be sure, but to many of the words which are common to us both, you attach connotations of which I am unaware. The ease of communication between us is somewhat impeded, also, by what I confess is your view of the older generation. You, rightly, look upon us as a group that has made a pretty thorough mess of a world, which, but for us and our grievous mistakes, might have been a more pleasant place in which to live. And it is unfortunate that many of the older generation unconsciously look upon those of the younger generation as being too youthful to have acquired that ripe wisdom which, so we elders often think, is the product of long years of experience, sometimes stuffed and sometimes stuffy. And so, because of the nuances of language, and a rather natural antipathy between different generations, we find it difficult to understand each other.

But despite the impediments to communicating with each other and to understanding each other, I shall attempt to discuss, very briefly, a matter which is urgent and of far-reaching significance to ourselves and to that large segment of the world of which we are a part.

Perhaps all eras of man's experience are full of inconsistent actions and contradictory attitudes. But, quite clearly, we are now, and have been since World War I, living in a period marked by striking contradictions. During the course of the last half century,



Lewis W. Douglas, '17, delivers the commencement address in the Rockwell Cage. Distinguished guests, members of the Corporation and of the Faculty, are seated on the stage.

At the open-air luncheon on commencement day, distinguished guests and retiring members of the Faculty may be seen at the head table (with flowers). In the foreground guests of Dean and Mrs. E. P. Brooks are (clockwise, beginning at near corner of table): Mrs. E. P. Brooks, Malcolm G. Kispert, '44, L. C. S. Barber, General Consul, England, Walter J. Beadle, '17, Dean Thomas P. Pitré, Mrs. Thomas P. Pitré, J. M. Hicks, Mrs. J. M. Hicks, Mrs. Suzanne Lunn, John A. Lunn, '17, George R. Harrison, Miss Minerva Cheshire, Mrs. E. C. Manderson, Hermon F. Bell, '03, Mrs. Arthur Shurcliffe, '03, Dean Andrey A. Potter, '03, John B. Wilbur, '26, Professor Walter H. Gale, '29, Mrs. Walter H. Gale, Mrs. Paul A. Gifford, Mrs. David Blunt, E. P. Brooks, '17, and Mrs. L. C. S. Barber.

we have accumulated knowledge of the laws of the physical universe which is as awesome in its magnitude as it is frightening in its quality. The deep advance that we have made into what at the turn of the century was called the unknown is not a mere accident of history. It is rather the culmination of a long period of inquiry into the nature of matter and the laws of nature which commenced when men's minds began to throw off the tyranny of prejudice and superstition.

This great institution is a reflection of what has been and what is, and you who are today receiving degrees at its hands are the repositories of a greater amount of knowledge of the material universe than any other group of young men and young women who have ever before departed from academic halls.

The application of scientific laws to the production of a countless number of commodities, goods and products, to satisfy the demands of human beings is one of the striking phenomena of the last several decades. It is the ability of man to make elaborate, delicate manufactures requiring materials from the far corners of the world that makes an easy movement of the products of man's efforts in the international channels of commerce so essential to civilized living. And it is the easier and freer movement of trade, combined with an easier and freer exchange of national currencies that is one of the necessary cementing influences among the nations of the world who view individual freedom – the status of the individual in society – in much the same way as do we.

When we here in America speak of freedom, we speak of a composite of things that reflects a deeply held and, I hope, enduring conception of society. We mean a society in which men may enjoy the right of assembly. We mean a system which vests men and women with the right to seek redress against the abuse of arbitrary private power and the excesses of public authority. We mean an order of things in which man may speak his mind and express his thoughts without fear of being snatched away into the oblivion of the prison house. We speak of a society in which people may worship the God of their own choice and in their own way. We mean human freedom, a society in which men and women may enjoy the benefits of a free market place; the right to own property; the right to earn one's living according to one's talents; the right to accumulate for enjoyment in the present and security for the future. We mean that freedom extends both rights and imposes responsibilities. Such freedom is indivisible. An impairment of the right to economic freedom ultimately means an infringement of the right of free speech and, finally, of the right to worship as one chooses.

But at the very time that science and modern technology, if they are to be fully exploited for the benefit of mankind and to the advantage of our country, requires an easier and freer movement of trade and money among the peoples of the world, we have been persistently, for three decades, pursuing policies which make the attainment of this objective more difficult, if not more remote. We seek a world in which currencies may be freely exchanged one into the other, because we realize that confidence in a currency is essential to an expansion in the production of goods and the performance of services for the benefit of our own countrymen and human kind everywhere. We become disgruntled with other countries because they do not adopt policies of easier and freer convertibility of their money. We become critical when they discriminate against American goods and invoke an elaborate network of restrictionism in efforts to maintain some semblance of economic and financial solvency. And yet we, ourselves, have been engaged in practices and have been following a public policy of excluding imports – a policy as incompatible with a stable currency as it is conducive to the intervention of the state in the economic affairs of our lives.

This is not unnatural. Certainly it is understandable. For a great people, populating a continental

mass like ours that has grown up in seclusion and has become, over the many years, so accustomed to protectionism and the subventions it provides, cannot be expected suddenly to change their habits or to modify their attitudes.

Let me punctuate what I mean when I say that we have pursued a policy of excluding imports by referring to a recently reported incident:

"The ping pong ball is bouncing its way to fame in world economic history. The United States tariff on those imported from Canada has recently been raised by administrative action from 10 per cent to 95 per cent of its value. Ping pong balls, customs authorities have ruled, since they are now shot from children's guns, are 'ammunition.' Perhaps, indeed, they symbolize the way United States tariff policy aims to kill international amity."

And so it happens that within the community of nations that believe in freedom of the individual, the imperatives of science have been contradicted by the pressures of politics. The universal and catholic impulses implicit in the advancement of scientific and technical knowledge have been frustrated by the parochial and divisive forces of vested and special interests. This is one of the many contradictions of our times.

A powerful case was made for a high protectionist policy during that period of American history when our country was, on balance, a debtor to the rest of the world. Our surpluses of raw materials and farm products – wheat, cotton, corn – found their natural and unsubsidized way into foreign markets and provided the foreign moneys necessary to pay interest on and to amortize the debts which we owed to foreign investors in American enterprise. But during World War I our position shifted. From being a great debtor, we became a great creditor. This was a dramatic and historic event unnoted by most Americans. Instead of being under the compulsion of exporting goods to service our debts to foreign investors, we were by all the rules of sound money and international order under the necessity of receiving imports in order that the foreigner's debts to us could be paid, for it must be self-evident that only with goods and services can debts be met. But we chose, on the one hand, to insist on the payment of the debts that foreigners had contracted and, on the other, to deny them the only method by which the debts could have been paid. The end was clear, definite, predictable and certain. The gold standard, an instrument of international discipline and order, an unimpeachable measure of value, a symbol of free enterprise and an impediment to dangerous experiments with authoritarian governmental practices, in September of 1931 came crashing down in fragments. The subtle international order of which it was an important pillar fell into disorder and confusion. A new period of modern history was inaugurated. The requirements of national interest and international order had been rejected. The return to normalcy had become the road to ruin and destruction.

Science had been contradicted by politics. Knowledge had been frustrated by indifference. Will the rules of history be violated, will the wisdom of William Graham Summer (who fought the intellectual battle so gallantly for sound money, the urgent requirement of our period and of economic procedure) once more be ignored?

Honored guests of Dean and Mrs. Edward L. Cochrane at the commencement luncheon in Dupont Court, include (in clockwise order from near end of table): Vannevar Bush '16, Mrs. Horace S. Ford, Mrs. Vannevar Bush, Horace S. Ford, Chester A. Higley, Vice-mayor of Boston, Colonel Charles F. Baish, '21, Mrs. Charles F. Baish, Lieutenant General Withers A. Burress, Colonel Leo A. Bessette, Captain Joseph M. Kiernan, '25, Mrs. Glenn S. Coleman, Colonel Glenn S. Coleman, Edward L. Cochrane, '20, Mrs. Joseph W. Barker, Dean Andrey A. Potter (bowing), James R. Killain, Jr., '26 (standing), Joseph W. Barker, '16, Marshall B. Dalton, '15, Everett S. Coldwell, '15, Joseph J. Snyder, 2-44, Andrew J. C. McGowan, '20, Robert T. Haslam, 11, Mrs. Robert T. Haslam, Thomas D. Brophy, '16, and Mrs. Joseph J. Snyder.

This problem of today is the same problem as it was in the Twenties and the Thirties. It is not a novelty. Though its dimensions are greater and though it has been aggravated by war and the threat of war, it is an issue which is common to your generation and to mine. But at least we have reached a point of vantage from which we now identify unmistakably an unbalance between the dollar area and the non-dollar area and the restrictionism and discrimination invoked by others which it necessarily entails. We recognize the benefits and the advantages, the enjoyments and the fruits of restoring an easy equilibrium at least in large parts of what we are disposed to call the free world. But we have not yet faced candidly and frankly the methods, the measures and the policies by which alone an enduring balance may be achieved.

It is not the exclusive responsibility of our own country to establish an equilibrium in the world. Other countries have important roles to play. But today I am speaking only of our part in the drama. We at home have one of three alternative courses to follow. We can continue, as we have since the close of World War II, to maintain a balance within the free world by subsidizing those portions of the American economic system which naturally produce surpluses whose only outlet is in foreign markets. We can continue, directly or indirectly, to buy their products, to give them away abroad, and to levy taxes therefor upon the general American taxpayer. We can continue a policy which makes both the exporter of his surplus and the foreign receiver of it perpetual

Seated at the speakers' table at the commencement day luncheon are, left to right: Mrs. E. Francis Bowditch, Professor Earle Buckingham, Mrs. Earle Buckingham, Dean E. Francis Bowditch, Mrs. Earl B. Millard, Professor Earl B. Millard, Mrs. James R. Killian Jr., Dr. Karl T. Compton, James R. Killian, Jr., '26, Dr. Lewis W. Douglas, '17, Mrs. Karl T. Compton (hidden by flowers), Professor Walter C. Voss, '32. At the near table (in clockwise order) are: Oscar F. Hedlund, Mrs. Oscar F. Hedlund, Sanfrid K. Johnson, George I. Chatfield, '28, Deborah Jope, Mrs. Ralph T. Jope, Mrs. Thomas C. Desmond, Dean Harold L. Hazen, '24, Mrs. George I. Chatfield, Ralph T. Jope, '28, Mrs. Thomas D. Cabot, and H. B. Richmond, '14.

mendicants of the American treasury. But this course corrupts our own society and taints, if it does not seriously damage, the relations of amity which should exist between the members of the coalition to which we belong.

The second method by which a balance can be achieved is to preserve our present policy of high protection which subjects our exports to the necessary measures of discrimination and exclusion which foreign countries inescapably must invoke against us. But this I hope we have learned means a decline in critical American exports from critical American areas. It means the insinuation of public authority into the economic affairs of vast segments of American society. It means, in many cases, the determination by public authority of that amount of goods which may be produced from time to time. It means the identification of the price at which those goods may be sold. It means the dispensation of public funds as compensation for not producing goods and not performing services which mankind desires. It means large public undertakings in efforts to absorb the unemployment which this policy produces. It means a wide variety of subventions from the public purse and a weight of taxation which historically has proved to be the undoing of all free societies.

The third alternative is that of giving other parts of the world at least an opportunity to support themselves so that by selling to us they may earn the dollars with which they may buy from us. This is not an easy policy for us to pursue. It cannot be invoked suddenly. It should not be adopted in an excessive form, for abrupt and intemperate actions may cause internal dislocations which will not be pleasant. But it is the only policy which, if pursued progressively and with courage, may produce the sort of balance which we recognize to be to our advantage. This is the only policy which may bind the nations of the free world together and enable them to achieve a real sense of security and stability. It is the only policy, combined with others, by which we can preserve within our own country the characteristics of a free society which are, alike, the sources of our strength and the envy of the world.

Freedom is a tender and sensitive enjoyment of man. Huge wars and threats of wars, huge expenditures on arms and defence produce such a migration of power to agencies of government that the preservation of human liberty has become as formidable a task as it is essential. In this world of ours it is our behavior and not our words which will determine our future, test the stuff of which we are made and the wisdom which we possess.

There are many ingredients to the cement which may bind the free peoples of the world together. But no number of international political institutions resting upon the shifting sands of economic disequilibrium and declining trade can long preserve fidelity to a common cause and loyalty to a common end.

No amount of exhortation — no constant incantation of the creed — will create and sustain the spirit and the strength of the coalition of free people against the disintegrating forces of financial disorder and commercial confusion.

It is for us no less than for others with whom we are and ought to be intimately associated — for the task is not ours alone — so to mould and so to devise measures of wisdom, and enlightened self-interest that an enduring harmony may at last be achieved among one and all free peoples.

On commencement day, the following family group was photographed. Left to right are: Myron Hoffman, '51, Allan S. Hoffman, '53, Saul A. Hoffman, '16, Nathaniel McL. Sage, '13, Mrs. Nathaniel McL. Sage, '13, Dr. Karl T. Compton, Edwin D. Ryer, '20, Ray C. Burrus, '22, Ray C. Burns, Jr., '53, Genevieve A. Lavedan, '54, Pierre F. Lavedan, '20, Joan M. von Fleckenstein, '53 Jackson G. von Fleckenstein, '19, Raymond A. Dietz, '53, Walter Dietz, '23, Walter E. Dietz, '52, Bruce B. Beckley, '53, Kenneth F. Beckley, '27, Hollis F. Ware, '25, Colin C. Ware, '53, Harold A. Knapp, Jr., '48, and Harold A. Knapp. '17.

The Chances for Peace

A Condition of Lasting World Peace is Reconstruction of Confidence and Respect between Nations and Peoples Combined with Mutual Help through Exchange of Ideas

By ERWIN D. CANHAM

ALUMNI BANQUET ADDRESS

THE evidence accumulates that we are not going to have a global war in the immediate future. Of course any kind of prophecy is rash, even though some people make radio or newspaper careers out of prediction. We must recognize that the Communists may be playing an elaborate hoax on us that would serve their purpose well. But the indications mount that they want a breathing spell – and the news hints that they need it – at least for the time being, especially in the satellite states.

The news also demonstrates that the United States needs, very badly, to revise and strengthen its own policies. Of course our present misunderstanding with Syngman Rhee should not have occurred. The Korean War itself should never have occurred and it could have been avoided. We should not have lost China to Communism. We should not have to tolerate what is called McCarthyism. We should not be as misunderstood and misinterpreted as we are, all the way from the Thames to Singapore, from Ottawa to Buenos Aires. We should be lifting the hearts and minds and bodies of men with the kind of practical, applied idealism that President Eisenhower so well expresses. We will not have done our part to set ourselves, and the world, on the path toward stability and peace until we begin to express and to live these principles more effectively. What can we do now to begin turning the tide in our favor?

Erwin D. Canham, Editor of the Christian Science Monitor, delivers his address at the Alumni Day banquet.

I really believe that our primary need is an affirmation of first principles. The men at Philadelphia found it necessary to clarify their beliefs through a Declaration of Independence. On at least four occasions Abraham Lincoln found that he had to put into clear and ringing words the principles that gave his cause meaning and purpose. Woodrow Wilson influenced world action much more by his eloquent statements of fundamentals than he was ever able to do at the conference table. So it has often been. Now, more than ever, I believe, we need a Declaration of Principles to affirm where we stand, what we stand for, and whither we are bound.

I am not so presumptuous as to hope to present you with the text of such a Declaration of Principles, but I can tell you some of the things I think it should include. I believe it should proclaim the only authentic revolution of human history, which is the emergent free system of which we are a part – the system extending all the way from the awareness of one God and the Law expressed on the hills of Judea long ago, to the distributive, equalitarian form of capitalism which we operate in this country today. I believe this statement of principles should be based on the great, dynamic goal of self-determination for men and nations, and on the present fact of the interdependence of men and nations. These are powerful twin principles. The concept of self-determination has immense dynamism. It has sometimes been perverted into narrow nationalism. It must be combined with the fact of interdependence, and set to work. More than anything else, what we stand for in the world today is the right of each man to make his own decisions, within the framework of the rights of others. Let us say so.

You can think of the great truths by which we live as well as I. You will not laugh nor will you sneer when I say that love for God and man is the central core of these truths. Love for God is not always, nor is it necessarily, expressed in formal religion. Rather is it shown in daily living. To the extent to which we seek to manifest integrity, social conscience, good will, and respect for ourselves and for others, we are living love. The decent, generous, friendly human being is living love. And the overwhelming part of the human race is decent and friendly – when people are given half a chance to understand one another.

Seated at the speakers' table at the Alumni Day luncheon (in usual reading order) are: George D. Stevenson, '53, Mrs. George D. Stevenson, Professor Elspeth D. Rostow, Erwin D. Canham, Mrs. Erwin D. Canham, Dr. Godfrey L. Cabot, '81 Mrs. Karl T. Compton, President James R. Killian, Jr., '26, Edwin D. Ryer, '20, Dean E. P. Brooks, '17.

Without making our declaration a mawkish or sentimental expression of formal religion, let us try to express some of these basic principles. When translated into political and economic terms, decency, kindness, and integrity become very powerful forces. I am not speaking of benevolence: we have learned that mere benevolence doesn't get very far, and that gratitude is a delicate flower that cannot be bought with money, and shouldn't be. But the kind of respect for one's fellow man, which is typical of the best of the human race, is a social principle of the greatest power.

Our political relations need to be converted into the terms by which we live the best of our human relations. Those wise and noble men laid down the principles of desirable human relations at Philadelphia; our great religious leaders – Moses and Christ Jesus and Paul, to mention only a few – proclaimed similar principles with utmost clarity. Let us proclaim the principles which are central to free society.

But of course words are not enough. As we so often say – and so rarely do – there must be deeds as well as words. What, then, are the terms in which American policy ought to be recast?

First, let us straighten out our relations with one another at home. We have plenty of problems, but none of them is more urgent than our present inability to trust one another. Confidence in the integrity and good faith of our fellow Americans, no matter how much we may disagree with them politically or economically, is essential. That is why the tactics that are called McCarthyism give us such concern. They are destroying our capacity to trust one another. The words of Learned Hand are so clear:

> That community is already in the process of dissolution where each man begins to eye his neighbor as a possible enemy, where nonconformity with the accepted creed, political as well as religious, is a mark of disaffection; where denunciation, without specification or backing, takes the place of evidence; where orthodoxy chokes freedom of dissent; where faith in the eventual supremacy of reason has become so timid that we dare not enter our convictions in the open lists to win or lose.

If the original problem on subversion had been dealt with vigilantly and responsibly, Senator McCarthy would not be the portent he is today. The tragedy is that three years ago, President Truman did not take the advice urged upon him by many to set up a judicious investigative commission of highest standing and character, to sift all charges and purge the public service in a rational, responsible, and honest manner. Of necessity the commission would have had to be composed of Americans of the greatest eminence and trustworthiness – it ought to have been a commission whose authority nobody could successfully question. But Mr. Truman left this task until too late; partly he left it to his friends in Congress and they failed.

Is it too late now for President Eisenhower to take the problem of subversion out of the hands of irresponsible investigators; is it too late to return judicial power to the judiciary, to restore administrative authority to the executive branch of government? I do not think so. Already, there is a growing fear of the power of irresponsible investigations, even in Congress. Even now, a top-level, nonpartisan Commission on Subversion could do a constructive job of detecting danger where it exists and, above all, of reassuring the people where danger does not exist. We must be able to replace fear and mistrust and hatred of one another with genuine and justified confidence in our fellow citizens. We must learn and affirm the difference between dissent and treason, between stupid irresponsibility and subversion.

There has been subversion in government, just as there has been some subversion in college faculties, in the pulpits, and in the editorial offices, but for every traitor there have been 20 men who have been merely stupid or irresponsible, and at least 100 honest and reasonably intelligent men. Let us stop being afraid of ideas; we do not have to suppress ideas and we cannot suppress them. We can destroy false ideas only with the best truth we know.

As soon as possible the State Department must be rehabilitated. I can understand the unwillingness of Secretary Dulles to endorse or defend many of the men he inherited. But surely the dismantling of the State Department has gone far enough. A current issue of a reputable magazine reports the silly extremes to which we have been led, in the following words:

> Not long ago, a friend of ours agreed to do some work for the State Department. Knowing how the world spins in 1953, he was not surprised to be visited by a senior investigator, who inquired about his past career and associations. However, at the stage when such interviews usually end, the investigator cleared his throat and pulled a paper out of his pocket. He explained that under his new instructions he was to get answers to these questions: (1) Do you believe in the Marshall Plan? (2) Do you believe in NATO? (3) What is your feeling about

Also at the speakers' table at the Alumni Day luncheon are (from left to right): Dean E. P. Brooks, '17, Mrs. Edwin D. Ryer, Dr. Karl T. Compton, Mrs. James R. Killian, Jr., Mrs. E. P. Brooks, Mr. Frederic A. Eustis, '03, Mrs. Frederic A. Eustis, Mr. J. Tyrrell Cheney, '03.

Tito? (4) Do you favor recognizing Franco? (5) Are you in favor of our intervention in Korea? (6) What do you think about China? (7) Do you consider yourself a supporter of Chiang Kai-shek?

Not without some justification somebody has recently said, "When the FBI investigators move into your neighborhood, either one of your friends is going to be hauled away to the penitentiary or he has been asked to accept a high position in the government." The plain fact is that, through the attacks upon the State and upon Secretary Dulles, coupled with President Eisenhower's unwillingness, as yet, to stand and fight, the State Department is a shambles. For this situation one can make allowances on three counts: (1) possibly many functions that had attached themselves to the State Department need to be sheared away; (2) evidently there were more than a few persons in the State Department who did not measure up to the highest standards of competence; and (3) it may be that a few persons of equivocal loyalty have remained. It is also true that a good number of able and faithful public servants have been unjustifiably attacked, and that there is nothing, today, to attract to the Department's service the persons of ability who ought to be there. The top diplomatic appointments of the Eisenhower-Dulles regime have been of very mixed character. If there is a single crying need in the Administration it is for the State Department to be restored to the vigor, prestige, efficiency, and experience which are sorely required in these days. We need wise technicians in our foreign service, and we have been driving them out – or terrorizing them – for too long. These men are just as important as the general staffs in the Pentagon or the intelligence officers in the Counter Intelligence Agency – it can be even argued that they are more important.

I have recently returned from a few weeks in Western Europe, as part of my regular job to keep in touch with news from all parts of the world. I can recall no time, in recent years, when opinion overseas was so puzzled about the United States. Rarely has an American President been so respected, or widely known when he took office, as was President Eisenhower. Rarely has there been so great a disillusionment as has resulted from the President's difficulties with Congress. Every thoughtful European with whom I talked last month asked me about Senator McCarthy. In one way or another, most of them expressed the view put – perhaps indiscreetly – by Clement Attlee: "One sometimes wonders who is the more powerful, the President or Senator McCarthy."

No doubt these persons have got an exaggerated idea of the Wisconsin Senator's importance from the publicity he has obtained. To these people, Senator McCarthy is a serious portent of homegrown Fascism. I tried to disabuse those I met, and the only point I am trying to make here is that the stability and purpose of the American government are now very much doubted in many parts of the world. Whenever President Eisenhower speaks, he helps to wipe away many misconceptions. When it becomes clear that he is able to get the major part of his program through Congress – if that comes about – more misconceptions will vanish.

Why is it important what others think about the American government? Why shouldn't we disregard them? Are we entered in a global popularity contest? Certainly not. But we have the responsibilities of world leadership. There must be confidence and respect between nations and peoples, just as there must be among individuals. We have to restore our world reputation for reliability and steadiness. The sooner we stop tearing ourselves apart, the sooner we can deal responsibly with the rest of the world, and the greater contribution we shall be able to make to the cause of peace.

What are the exact terms of the peace problem? First, of course, we must strengthen and preserve the military capacity of the free world. We must have sufficient power to render aggression suicidal. But this power must be responsibly stewarded, with policies that are not, and do not seem to be, reckless or provocative. Second, and related to the first, we must do our part in securing and maintaining the economic stability of the free world. More than anything else, the other free nations have been alarmed at being caught between Soviet and American military power, or of being drawn into the maelstrom of a major economic recession in the United States. Third, we can regain the clear leadership of the free world by affirming and explaining the meaning of the historic liberating forces of which we are the principal Twentieth Century expression. Fourth, we can share and exemplify these liberating forces much more effectively than we have done hitherto. Such a policy does not require this country to engage in a vast give-away program, but it does necessitate the opening up of better two-way channels of communication and ac-

For many years, a pleasant, relaxing, social event of mid-afternoon on Alumni Day has been the informal reception held for Alumni and friends of the Institute at the President's House. This year, while President and Mrs. James R. Killian, Jr., held open house with the Alumni Association's President and Mrs. Edwin D. Ryer in the receiving line, many guests mingled in the garden of the President's House as shown here. The dome of Building 10 may be seen in the background with Walker Memorial (left) and Monroe Dormitory (right) just beyond garden wall.

tion between ourselves and other peoples. Fifth, we need to develop far wider use of our great contribution to the mid-century – the dynamics of voluntary private organization.

The last point needs explanation. I believe we have learned that there are valuable social alternatives to communism or socialism at one extreme or cartels, monopoly, or old-school capitalism at the other. Other peoples are beginning to learn the same thing. In the United States we have evolved a degree of socially responsible capitalism. But our system has been articulated and helped to work by our instinctive development of private, voluntary organization. In this country we have a passion for voluntary organization, not merely because we like to wear funny hats and sing community songs, but because we have sensed that, in our kind of country, we will have either free organization or statist organization. We have chosen free organization.

Look about you, in your personal experience, and count the channels of professional or civic communication which are part of your daily life. There are some 4,000 *national* trade, professional, and other types of nonprofit organizations in the United States. There are 12,000 local trade associations, 4,000 chambers of commerce, 15,000 civic service groups, 100,000 local chapters and clubs of women, 70,000 labor union locals, 10,000 farmer groups – I am out of breath and the list is just beginning.

These organizations have been of incalculable value in raising standards, in generalizing skills and knowledge. We have learned the great, historic lesson that comes usually only in peril, namely, that it is far more beneficial to share than to hoard or secrete. We did not know this a half century ago; we knew it far less well a quarter century ago, or even a decade ago. The educators, the scientists, the engineers, the service clubs, the trade associations, have all set patterns for the pooling of ideas.

Mutual help through the free interchange of ideas can help save world society. It is based upon a deeply spiritual principle, for it comprises respect for individual man and an awareness of his social interdependence. Application of the principles of mutual help and the sharing of knowledge can surpass achievements of totalitarianism every time. They can redeem the selfish drawbacks of old-school capitalism. They can curb monopoly; they can open doors for the underdeveloped in the world who are clamoring for their day in the sun.

Ours is indeed an age of awakening. The masses of humankind are on the march. They must learn the terms of the choice confronting them. Will they go toward totalitarianism and new slavery? Or will they stay with the emergent social revolution, which is both very old and yet very new, and which the United States has carried as far forward as anybody else? Of course, I do not say that our national experience will apply exactly to the needs and aptitudes of any other people. What the men and nations of Asia and Africa can apply will be solutions adapted to their needs and aptitudes. But there is much in our experience that is universal. There is much that we can share. Finally – and this is very important – there is also much that we can learn.

Let us, therefore, open up, for relations with the rest of the world, the same kind of channels of voluntary private organizations which have so richly irrigated our national society. Let every national organization ask itself: "What can we do to transmit our experience across frontiers and to learn from others?" It may be that a simple program involving exchange of persons, or the exchange, on a regular basis, of printed technical information will be adequate. Possibly any of a dozen other ways, in which we can begin to talk with other people in terms of our mutual experience, may need development. No language is more evocative, no *lingua franca* more free, than the language of common experience.

The basis of world society and community among nations will not be found, I am confident, in political or governmental forms. That is a long way off, and it involves dangers. But what we can do, beginning now, is to open the channels by which peoples can speak directly to other peoples. This has already been done by scientific groups, service clubs, and many other American organizations. Perhaps we need a clearing-house by which the work of such organizations can be made more effective. In any case, we have a mandate. It is to lead the world's people in a revolution – not toward the old chains of slavery to which Marxism and any form of totalitarianism would condemn them under new names – but toward the developing freedom which is the birthright of societies based upon the rights of man. Let us find the ways of leading that revolution. As we do, we will build the solid groundwork of peace.

Commencement, Reunion and Alumni Day Activities

THE five days from June 11 to June 15, 1953, inclusive, may well be numbered among the busiest which M.I.T. has lived through since the Mid-Century Convocation of 1949. Several thousand persons proudly watched almost 1,000 students become Technology Alumni at commencement exercises in the Rockwell Cage on Friday, June 12; approximately 1,200 persons heard James R. Killian, Jr., '26, give his "State of the Institute" address at the Alumni Day luncheon on June 15, and, on the night of the same day, some 850 Alumni took part in the Stein-on-the-Table Banquet, while 120 wives had their own banquet in adjacent rooms in Boston's Hotel Statler. In addition to these events, which have become accepted events in connection with commencement and Alumni Day activities, separate ceremonies for the commissioning of officers in the Reserve Officers' Training Corps were held on Thursday, June 11, this year, rather than as part of Commencement Day as was the practice in former years.

Perhaps the greatest innovation in events which ended the school year was the quarter-century reunion of the Class of 1928, who staged a three-day gathering on the M.I.T. Campus with members of the Class and their families quartered in Baker House. For the first time in the Institute's history a class reunion could be held, in its entirety, "back at Tech" and those who participated were enthusiastic in their praise for the novel and elaborate program worked out in great detail by Ralph T. Jope, George I. Chatfield, William H. Carlisle, Jr., James Donovan, and other hard-working members of the Class of 1928. The success of this first "on campus" family reunion may well provide stimulus for other classes to return to Technology to be "renourished by thy side."

As might be expected, the rights—and responsibilities—of free men was the central core of inspirational thinking exhibited in the baccalaureate address of the Reverend Frederick M. Meek of the Old South Church in Boston, in the Alumni Day banquet address of Erwin D. Canham, editor of the *Christian Science Monitor*, and in the valedictory address of Dr. Killian. The texts of these addresses will be found on earlier pages of this issue, while Dr. Killian's report to Alumni forms a later portion of this summary report.

Senior Week Activities

For the graduating seniors, social events began on Friday, June 5, with a Class Banquet at Rockwell Cage and were concluded with the Commencement Luncheon and President's Reception in the Great Court on Friday, June 12. Walker Memorial was the scene of the Class Party and Carnival on the evening of Saturday, June 6. A mixed outing to the Blue Hills Reservation was planned for Sunday, the 7th, and a cruise to Nantasket was an evening event on Monday, June 8. The annual Senior Ball took place at the Sheraton Plaza in Boston on Tuesday, June 9, and no activities were planned for the following day.

In contrast with the exercises of former years, a separate ceremony for awarding Army and Air Force commissions to graduates who had taken the ad-

At the near table, guests of Dean and Mrs. Harrison at commencement day luncheon included (in clockwise order): Ralph H. Howes, '03, Mrs. Roger D. Babson, Roger D. Babson, '03, Edward M. Chadbourne, '03, Omar S. Swenson, '03, Charles L. Bates, '03, LeRoy L. Hunter, '03, Ernest A. Comer, '03, Carleton F. Green, '03, Edward J. Ruxton, '03, George B. Wood, '03, James S. Sheafe, '03, J. Tyrrell Cheney, '03, and, at far side of table, facing camera, Paul R. Parker, '03, Mrs. Paul R. Parker, Richard M. Lawton, '03, John Joseph A. Nolan, '03, Charles B. Cox, '03, George A. Sloan, Mrs. James M. Barker, Redfield Proctor, '02, James M. Barker, '07, Mrs. John J. Dooley, John J. Dooley, '03, and Mrs. LeRoy Thwing

Members of the Class of 1928 and their families, . . .

vanced program in the Reserve Officers' Training Corps was held in Huntington Hall (Room 10-250) on Thursday morning, June 11. The invocation was given by Father Edward J. Nugent. Julius A. Stratton, '23, Vice-president and Provost of M.I.T., represented the Institute at these commissioning exercises which were planned by Colonel Charles F. Baish, '21, Head of the Department of Military Science at M.I.T. Lieutenant General Earle E. Partridge, Commanding General, Air Research and Development Command, and Major General Roderick R. Allen, Commanding General, Fort Devens and Boston Army Base, were the principal speakers for the Air Force and Army, respectively. Colonel Glenn C. Coleman, Head of the Department of Air Science and Tactics at M.I.T., administered the oath of office to 174 men who received their bars as second lieutenants. (In addition, approximately 70 men will receive their commissions at the end of Summer Camp.) The presentation of commissions was made by General Partridge to 74 Air Force men, and by General Allen to 176 Army men. Father Peter R. Blynn gave the benediction, and the Needham High School Band gave an admirable demonstration of their musical training by opening and closing the ceremonies by way of horn, fife, and drum.

A high light of the reunion of the Class of 1928 was the Shore Dinner on Sunday, June 14, in Walker Memorial. At the speakers' table (left to right) are: President James R. Killian, Jr., '26 (with volume of The Technology Review*), Mrs. Erwin H. Schell, Professor Erwin H. Schell, 12, who spoke on "The Promise of Tomorrow," and Ralph T. Jope, '28.*

Baccalaureate Service

On Thursday afternoon, June 11, the senior class picture was taken on the steps of Building 10, with the graduates in cap and gown. Class officers then led the procession to Walker Memorial where the baccalaureate services were held. E. Francis Bowditch, Dean of Students at M.I.T., gave the call to worship. James R. Killian, Jr., '26, President of the Institute, selected Matthew 5:2-17 for the Scripture reading, and the Reverend Frederick M. Meek, Minister of the Old South Church, Boston, gave the baccalaureate address, "Democracy Is Not Enough"—the text of which The Review is happy to publish on page 485. Music was provided by Philip M. Richardson, '26, at the organ, and the M.I.T. Choir, under the direction of Klaus Liepmann, Associate Professor of Music.

Commencement Exercises

Friday, June 12, was an important day for members of the M.I.T. Corporation, the Faculty, and especially for the 949 persons who received a total of 987 degrees at the commencement exercises in Rockwell Cage. Opening the day's activities was a Corporation Breakfast which was given by Karl T. Compton, Chairman of the M.I.T. Corporation, and President Killian.

At 10:30, the candidates for degrees filed into Rockwell Cage, leading the academic procession which also included guests of honor, members of the Corporation, members of the Class of 1903, officers of the Class of 1928, and the Faculty. The procession was led by Edwin D. Ryer, '20, President of the Alumni Association. The Most Reverend Richard J. Cushing, Archbishop of Boston, gave the invocation, and Lewis W. Douglas, '17, former United States Ambassador to Great Britain, delivered the commencement address – text of which will be found on page 491 of this issue. As president of the Institute, Dr. Killian, with the assistance of the deans of the five professional schools, presented 89 doctor's degrees, 34 advanced engineering degrees, 267 mas-

photographed on the steps of the Alfred P. Sloan building.

ter's degrees, and 597 bachelor's degrees. Officers of the Class of 1953 who had places of honor in these exercises included: George D. Stevenson, Permanent Class President; Vinson W. Bronson, Jr., Secretary; Mark B. Schupack, First Marshal; John R. O'Donnell, Second Marshal; and George J. Fuld, Third Marshal. Among the recipients of the degrees, representatives of the distaff side included: Mrs. Bianca B. Bincer, Miss Joan M. von Fleckenstein, Miss Patricia A. Jackson, Miss Caroline S. Littlejohn, Miss Carol Robinson, Mrs. Virginia F. Ross, Miss Alice R. Schomburg, Miss Ann C. Wilfert, and Miss Janet D. Zachs.

Following the presentation of degrees, President Killian gave the valedictory address. *The Review* is happy to be able to present this address to its readers on page 489 of this issue.

Members of the graduating class were favored with greater opportunities for employment than ever before in the Institute's history, although many will soon serve in the Armed Forces.

Commencement Luncheon

Following the highly successful plan inaugurated in 1951, a Commencement Luncheon was held under canvas in Du Pont Court for seniors and their guests. In addition to those taking a major part in the commencement exercises, members of the Faculty who retire at the end of the school year were seated at the head table. Members of the Corporation, and of the 50-year Class, and other distinguished guests had special tables reserved for them as guests of the deans of the five professional schools.

At the conclusion of the buffet-type luncheon, President Killian called on Andrey A. Potter, '03, Dean of Engineering at Purdue University, who spoke briefly on the contrasts between the Institute's present educational facilities and those of 50 years ago when the Class of 1903 was graduated from "Boston Tech" on the site of the present New England Mutual Life Insurance Company building, on Boylston Street.

President Killian then took occasion to comment on the successful achievements of the members of the Class of 1903 throughout the past half century. Those whose careers were specifically singled out for mention were: Frank B. Jewett,* Dean Potter, Richard C. Tolman,* Dr. Katharine Blunt, Susan L. Clarke, George W. Swett, Professor of Machine Design, Emeritus, Walter R. MacCornack, Professor John W. Howard,* Raymond M. Hood,* Andrew H. Hepburn, Carlton F. Green, Robert J. King, William V. McMenimen, Edwin F. Greene, the Eustis twins (Augustus H. and Frederic A.), and James A. Cushman, Assistant Class Secretary.

President Killian also took opportunity to introduce Faculty members of the M. I. T. family, seated at the head table, who will retire on July 1. Those retiring are: Earle Buckingham, Professor of Mechanical Engineering; John M. Lessells, Associate Professor of Mechanical Engineering; Earl B. Millard, Professor of Physical Chemistry; and Professor Walter C. Voss, '32, in charge of the Department of Building Engineering and Construction. From M. I. T.'s athletic program, Oscar F. Hedlund, Coach of Track, and Sanfrid K. Johnson, Trainer, are retiring. Additional retirements are: Wallace M. Ross, for 34 years active in the administration of the Technology Christian Association; Mrs. Ruth McG. Lane, Vail Librarian; and Miss Mirian S. Smith, Reference Librarian. Many of this group will continue to serve the Institute on a part-time basis.

Representing the Class of 1953, Marion C. Manderson, President of the Institute Committee and

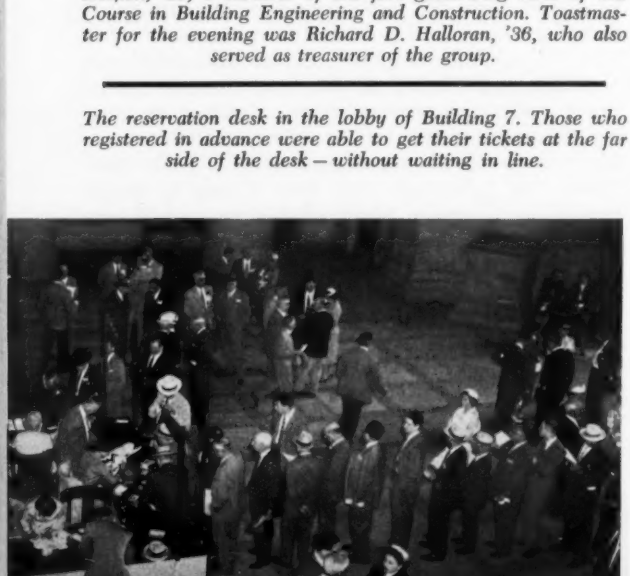
* Deceased.

With suitable protection for the Shore Dinner (at far side of table, left to right) are: Professor Truman S. Gray, '29, Mrs. Truman S. Gray, Dr. John W. Chamberlain, '28, and Mrs. John W. Chamberlain. At near side of table is Richard B. Harris, son of Professor Robert S. Harris, '28.

Professor Walter C. Voss, '32 retiring head of the Course in Building Engineering and Construction, was the guest of honor at a banquet given by Alumni at the Hotel Shelton on June 13. In honor of the occasion, the Alumni and friends of the Course presented to the Institute the sum of $5,400, to be used to establish the Tucker-Voss Award Fund in the names of Professor Voss and his predecessor, the late Professor Ross F. Tucker, who was the first head of the Course. The income from the fund is to be used as a cash award annually to a student in Building Engineering and Construction on the basis of high scholastic standing, leadership, and promise in the field of building. Shown in the reception line are (left to right): Mrs. Albert J. O'Neill, Professor Voss, Mrs. Walter C. Voss, President James R. Killian, Jr., '26, and Mrs. James R. Killian, Jr. Banquet guests included Professor and Mrs. Albert G. H. Dietz, and Mr. and Mrs. Delbert L. Rhind, in addition to those shown above in the receiving line.

The fund was presented to Dr. Killian by Robert M. Becker, '34, Chairman of the alumni group. Illuminated scrolls describing the fund were presented to Professor Voss and Professor Dietz, the new acting head of the Course, by Karnig S. Dinjian, '29, a member of the first graduating class of the Course in Building Engineering and Construction. Toastmaster for the evening was Richard D. Halloran, '36, who also served as treasurer of the group.

The reservation desk in the lobby of Building 7. Those who registered in advance were able to get their tickets at the far side of the desk – without waiting in line.



of the Senior Class for the year 1952-1953, presented the student's point of view in his address to parents and friends of the graduates. As his classmates continue graduate work, begin their professional careers, or enter the armed services, Mr. Manderson took cognizance of the sacrifices which parents frequently make in order to provide an education for their children. He concluded his remarks by indicating that he was just beginning to appreciate some of the problems that parents must face, since he had been married just five days prior to commencement.

As final speaker at the luncheon, Dr. Compton had a special message for the parents whose pride at commencement exercises he could well understand since his own son, Charles Arthur, had been graduated from the Institute in 1951.

Following the luncheon, Dr. and Mrs. Compton, President and Mrs. Killian, and Mr. and Mrs. Manderson received guests in the Great Court. At the suggestion of President Killian, fathers and sons who had been graduated from the Institute were photographed as a group in the Great Court with the dome of Building 10 as an appropriate background.

Reunion of the Class of 1928

For the first time in the history of the Institute, a family class reunion was held on the Technology campus, with members of the reunioning class housed in Institute dormitories. Since Baker House, in which members of the Class of 1928 were housed, was built with the aid of funds from the Alumni, it was especially appropriate that this distinctive housing unit be the scene of the first on-campus family reunion.

Under the leadership of William H. Carlisle, Jr., chairman, Dr. John W. Chamberlain, George I. Chatfield, James Donovan, Ralph T. Jope, and Walter J. Smith – all of the Class of 1928 – an exceedingly full and attractive program of events was planned for the 25th reunion of the Class of 1928. From the time of arrival of the first guests, early in the afternoon on Friday, June 12, until the conclusion of the events of Alumni Day on Monday, June 15, under the guidance of 21 committees comprised of 30 members, a full program of activities was in operation. For many Alumni returning to Technology, the reunion provided their first opportunity, since graduation, to see the many changes that had taken place along the Charles River, and they took full advantage of the many new M.I.T. recreational facilities. Alumni, their families, and friends could sail on the Charles in the Institute's new fleet of plastic Fiberglas dinghies, they could swim in the Alumni Pool, they could engage in athletic activities on Briggs Field, they could have luncheon at the Faculty Club, or they could roam the halls of the Hayden Library and other academic buildings. Special efforts were made to provide suitable activities for the wives and children. As a unit, the family could engage in softball, with the younger generation challenging the older; those who wished to play golf could tee off at the course of the Sandy Burr Golf Club; an informal record dance was staged, as was also a trip to Boston's

Members of the Class of 1903 gathered for luncheon on Alumni Day include, in clockwise order: Mrs. James W. Welsh, (in white hat), James W. Welsh, '03, Mrs. John J. Dooley, Arthur B. Allen, '03, James A. Cushman, '03, Walter P. Regestein, '03, Emmor H. Millard, '03, George B. Wood, '03, Mrs. Alexander B. Healy, John J. Dooley, '03, Mrs. LeRoy B. Gould, '03, LeRoy B. Gould, '03, Alexander B. Healy, '03 (at far end of table), Augustus H. Eustis, '03, Miss Sophie G. Blunt, '03, Mrs. Augustus H. Eustis, Charles L. Bates, '03, Mrs. George H. Garcelon, George H. Carcelon, '03, Mrs. Howard S. Morse, Howard S. Morse, '03, Thomas E. Sears, '03, Mrs. Thomas E. Sears, Mrs. Clarence M. Joyce, Clarence M. Joyce, '03.

Museum of Science, which was especially planned for the youngsters. All in all, those participating in their quarter-century reunion had much to occupy them, and they appeared to enjoy themselves completely.

Shore Dinner

On Sunday, June 14, the 25-year Class had a shore dinner in Walker Memorial, at which Faculty members who taught at the Institute 25 years ago and their wives were invited guests of the Class. About 420 persons attended this midday occasion which was made doubly festive by the presence of 110 Faculty and staff members and their wives.

At the conclusion of the shore dinner, Karl T. Compton, chairman of the Corporation, spoke on the major changes which had taken place at the Institute during the past 25 years, and reflected in the membership of the Corporation as well as elsewhere. Of 63 members of the Corporation at the present time (of whom the Governor, Chief Justice, and the Commissioner of Education are officers of the Commonwealth), only four were members of the Corporation in 1928. Dr. Compton pointed out three particularly significant events which have taken place during the past decade, as follows: (1) An educational survey, for the purpose of making a fundamental study of the Institute's role in technological education in this century, had been completed by the Faculty, and recommendations of the Faculty survey are now in operation; (2) in order to meet the expanding needs of the Institute in higher education and research, and to provide a more desirable and pleasant environment, the Development Program was put into operation and has raised $26,000,000 during the intensive portion of its operations; the Development Office continues in operation, and through its efforts the Institute's endowment is steadily growing; (3) a new era of leadership has emerged with the splendid co-operation of the president, vice-presidents, deans, department heads, and other administrative officers in the Institute.

Following Dr. Compton, James R. Killian, Jr., '26, President, summarized his recollection of the Class of 1928 and acquainted the listeners with other changes that had taken place. He expressed appreciation to the Class for the major contributions it had made as undergraduates in promoting student government at the Institute. He also enthusiastically endorsed the leadership which the Class had taken in developing an insurance plan that now provides a substantial gift to the Institute for endowment – the income of which is to be used for general purposes.

President Killian recalled that the Class of 1928 had contributed a number of persons to the Institute's staff at the present time, among whom are: Eugene W. Boehne, Professor of Electrical Engineering; Dr. John W. Chamberlain, Associate Medical Director; Robert S. Harris, Professor of Biochemistry of Nutrition; Augustus R. Rogowski, Associate Professor of Mechanical Engineering; Robert S. Woodbury, Assistant Professor of English and History; William H. Carlisle, Jr., Manager of Student Personnel. Finally, President Killian seemed to take special pride in announcing that he had been instrumental in inducing Ralph T. Jope, President of the Class of 1928, to join the staff of *The Technology Review* upon his graduation, and later, to take a very active part in the Institute's Development Program.

A symposium program was conducted by the Department of Electrical Engineering at which Dr. Vannevar Bush, '16 (standing), was the principal speaker. Seated from left to right are: Gordon S. Brown, '31, Head of the Department of Electrical Engineering, Julius A. Stratton, '23, Provost and Vice-president, Edward L. Cochrane, '20, Dean of the School of Engineering, and Samuel H. Caldwell, '25, Professor of Electrical Engineering.

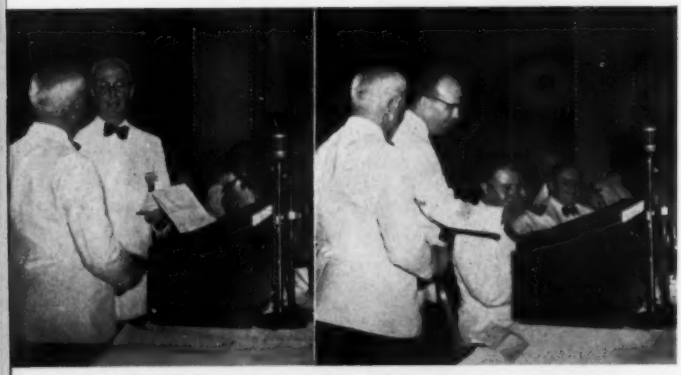
Seated at the table reserved for the Class of 1898 at the Alumni Day luncheon is Mrs. Karl W. Waterson at the end of the table, back to camera. To her left and continuing in clockwise order are: Dr. Alice M. Tallant, '98, Mrs. K. V. R. Lansingh, Lester D. Gardner, 98, K. V. R. Lansingh, '98, Mrs. Ernest F. Russ, Mrs. Howard L. Bodwell, Howard L. Bodwell, '98, M. De Kay Thompson, '98, Mrs. Arthur A. Blanchard, Miles S. Sherrill, '99, Daniel W. Edgerly, '98, Edward N. Milliken, '98. Far to near, on right-hand side of table are: Fred B. Dawes, '98, Carl S. High, '98, Elliott R. Barker, '98, Miss M. L. Chapin, Edward S. Chapin, '98, Karl W. Waterson, '57, Karl W. Waterson, '98, Edmund C. Little, '98, Ernest F. Russ, '98, Frank B. Perry, '98, Miss Virginia H. Soutar, Paul B. Wesson, '98, and Miss Frances E. Curtiss.

Dr. Killian took occasion to emphasize changes that had taken place at M.I.T. during the past quarter century by citing statistics of its growth in several instances, as follows:

	1928	*1953*
Student body	2,700	5,100
Budget	$3,120,000	$46,500,000
Academic staff	467	1,456
Total staff (including D.I.C.)	978	6,000
Alumni	13,335	47,230

President Killian also announced that for the 11 months ending May 31, gifts to the Institute had amounted to $5,336,888.90, of which $2,600,000 has been invested, $2,157,000 has been used for current operations, and $500,000 has been set aside as unallocated funds. Since the end of the Development Fund the increase in endowment has been $3,000,000. Significant contributions during the past year include $1,000,000 from individual corporations, and $500,000 from the Rockefeller Foundation. President Killian also announced that it is the aim of the Institute to increase its current endowment by $20,000,000 over the next five years.

Dr. Karl T. Compton gratefully receives class gifts at the Alumni Day banquet. At the left, Frederic A. Eustis, '03, presents the gift of the 50-year Class and at the right Ralph T. Jope, '28, makes the presentation for the Class of 1928.



As master of ceremonies at the shore dinner, Mr. Jope called on Professor Erwin H. Schell, '12, in charge of the Course in Business and Engineering Administration, to present his address, "The Promise of Tomorrow." Professor Schell's address was concerned primarily with the future outlook for members of the Class of 1928, and held up as prospect a particularly promising future for those who, he said, were entering "the afternoon of life."

James Donovan, chairman of the Reunion Finance Committee, then made a brief announcement during which silver cigarette cases for desk use were presented to Mr. Jope and also to George I. Chatfield in recognition of their 25 years of faithful service to the Class as President and Secretary, respectively. At the conclusion of the shore dinner, members of the Class crossed Memorial Drive to the Sailing Pavilion and took a short boat trip up the Charles River to the residence of the Dean of Students, where they were guests, at afternoon tea, of Dean and Mrs. E. Francis Bowditch.

Meeting of Honorary Secretaries

At 5:30 P.M. on Sunday, June 14, the Faculty Club was the scene of a social gathering for 103 Honorary Secretaries, educational counselors and club officers, and 42 members of the Institute's staff. Among the Institute's ambassadors of good will who attended this meeting were a number from distant parts of the world. From Tokyo came Yoshinori Chatani, '22, to claim the long-distance record, but Gustavo A. Calleja, '43, of Havana, and Constant W. Chase, Jr., '34, from the Canal Zone were also well in the running.

President Killian called on Dr. Compton who was given credit for initiating meetings of the Honorary Secretaries. Obviously pleased to record the work which the Honorary Secretaries are doing for M.I.T., Dr. Compton related how this group represented the Institute throughout the country and assisted with administrative officers in their selection of entering freshmen. Dr. Compton gave a good deal of credit for the concept of an organization of Honorary Secretaries to Professor Schell.

As dean of the Institute's latest school, E. P. Brooks, '17, brought the audience up to date on the formation and operation of the School of Industrial Management. Dean Brooks was careful to point out that in many respects the School is not a new concept at M.I.T. since, through Course XV, the Institute has

had an interest in industrial management since 1912. Nevertheless the formation of the new School gives the Institute opportunity to expand its activities in industrial management. A major aim of the School is to integrate its activities with the general technical training which is the backbone of M.I.T. training. Dean Brooks pointed out that the School is particularly interested in attracting students who have demonstrated their ability to lead people. He stated that students from 30 engineering schools will be represented in the student body next year, and that the Honorary Secretaries could be of service in aiding in the selection of suitable candidates at both the undergraduate and graduate levels.

One of the most difficult tasks confronting the new School has been the development of an effective bridge between the classroom and industry. Through extracurricular activities many undergraduate students obtain some experience in management on the campus. Students frequently visit manufacturing plants, and during the past year the president of one firm asked that students review and report on certain problems in his plants. Contacts with industry are also maintained by many Faculty members who are consultants for individual firms. In addition, seminars conducted by individual leaders help to acquaint students with problems of industry.

Dean Brooks felt that the effectiveness of students in their first jobs might be increased if industry were able to put into effect the following points: (1) graduates should be watched with sufficient care and understanding so that they do not gain the impression that they are lost, particularly in large organizations; (2) it appears desirable to give the graduates assurance that they will be working for their first job for a limited period of time and to offer opportunity for change after a year or two; (3) no special consideration should be given to students aside from the points already mentioned.

As the Institute's "Freshman Dean," Edward L. Cochrane, '20, Dean of the School of Engineering, reported the progress made during the past year and aimed to develop the strength of the Institute's Schools without creating vertical division according to subject matter. Dean Cochrane spoke particularly of the changes which have come about recently in student housing, in extracurricular activities, and better student-faculty relations – all of which had been directed to humanizing the M.I.T. environment.

As the final speaker of the evening, President Killian developed the thought of humanizing the Institute and took pains to point out that it was the M.I.T. policy to emphasize the development of the individual. A primary objective of the Institute's present activities is to promote a better and more thoroughly integrated educational community. In part, this objective is being fostered through such physical facilities as the residential apartment house at 100 Memorial Drive (which houses a score or more members of the M.I.T. family) and the Faculty Club which, with a membership of 1,200, triples the estimated membership of 400, made before the new club rooms were available. In developing the academic and residential facilities on a long-term basis, plans are to use the land east of Massachusetts Avenue for research and educational activities, whereas land west of Massachusetts Avenue is to be set aside for student residences, athletics, and a center for student activities. Present plans call for the establishment, on land west of Massachusetts Avenue, for a shopping area which will include a book store, bank, post office, drug store, and center for student government. Already a new auditorium is being erected on this land, and at its meeting on June 12, the Corporation approved the construction of a nondenominational chapel to provide a center for religious activities. Student-Faculty relations have been strengthened through the recent establishment of such rooms as the Dugald C. Jackson Room in the Department of Electrical Engineering, the Du Pont Room in Aeronautical Engineering, the Spofford Room in Civil Engineering, and the Commons Room in the new Metals Processing Laboratory. Considerable progress has already been made in developing M.I.T. as a residential college. The transformation of the old Riverside Apartment Hotel into a new dormitory (Burton House) dedicated last year, made it possible

Three members of the Class of 1896 enjoy informal conversation during lull in Alumni Day banquet activities. Left to right are: Dr. John A. Rockwell, '96, Paul W. Litchfield, '96, and Myron E. Pierce, '96.

Those in attendance at the Faculty table at the Alumni Day banquet (in clockwise order, from opening in foreground) are: Frederick G. Hartwell, Dean E. Francis Bowditch, Professor Walter C. Voss, '32, Wallace M. Ross, Delbert L. Rhind, Thomas P. Pitré, James W. F. MacDonald.

At the left are members of the 50-year Class at the Alumni Day banquet. In clockwise order are: George B. Bradshaw, '03, (in light coat with back to camera), Arthur B. Allen, '03, Clarence M. Joyce, '03, Andrew H. Hepburn, '03, Leroy B. Gould, '03, James A. Cushman, '03, Emmor H. Millard, '03, Charles L. Bates, '03, Hermon F. Bell, '03, Howard S. Morse, '03.

A quarter of a century of professional life seems not to have dampened the spirits of these members at one of the 1928 tables. In clockwise order from foreground opening are: Noel C. Olmstead, '28, Roland D. Earle, '29, (only hand and stein showing). Chester M. Day, '28, (only hand and stein showing), A. Wentworth Erickson, '28, William H. Carlisle, Jr., '28, Kenneth Dow, Albert W. Bridges, Frank M. Baldwin, and Carl J. Bernhardt.

for the Institute to guarantee each freshman a dormitory room on the campus. All freshmen are now required to live in a dormitory or fraternity house. A comparatively new requirement in housing which the Institute faces is that of providing living quarters for married students, since approximately 20 per cent of the Institute's students are now married. Since 1950, the student body has increased 62 per cent, and increase in floor space has been about 60 per cent. President Killian used these figures to emphasize the Institute's primary interest in increasing the intensiveness of its operations rather than merely increasing the numerical size of its student body.

Alumni Day

Perfect weather greeted some 1,200 Alumni and members of their families who returned to the Institute to attend the departmental reunions, the luncheon in Du Pont Court, the dedication of the World War II Memorial, the reception at the President's House in Cambridge, as well as the annual Stein-on-the-Table Banquet at the Hotel Statler in Boston, on June 15.

As usual the registration desk in the lobby of Building 7 was the scene of most of the morning activities until 10:30 when the Departments of Aeronautical Engineering, Biology, Chemical Engineering, Civil Engineering, Electrical Engineering, Food Technology, Industrial Management, Mechanical Engineering, and Naval Architecture and Marine Engineering held informal open house receptions. The new John Thompson Dorrance Laboratories of Biology and Food Technology, which were formerly dedicated on June 25, were open for inspection and members of the staffs of both departments were on hand to welcome visitors. *The Review* hopes to present a description of these new laboratories early next fall.

Course VI Reunion

Renovated laboratories in the Department of Electrical Engineering were also open to visitors. In the Department of Electrical Engineering the departmental activities were centered around a program of dedication of new and expanded laboratory facilities in Building 10 (made possible by transfer of the Department of Biology and Food Technology to the Dorrance Laboratory) and a symposium-discussion on new methods of teaching professional work in modern electrical engineering. Julius A. Stratton, '23, Vice-president and Provost, acted as master of ceremonies in the dedication exercises at which the speakers were: Vannevar Bush, '16, President of the Carnegie Institution of Washington; Professor Gordon S. Brown, '31, Head of the Department of Electrical Engineering; and Admiral Edward L. Cochrane, '20, Dean of the School of Engineering.

In opening the dedication ceremonies, Dr. Stratton recalled the state of affairs in the Department in 1920 when he first became associated with M.I.T. This period was a particularly critical era in the Institute's history, since President Richard C. Maclaurin died suddenly and some time was required to find a successor. In addition, more than 1,000 freshmen entered the Institute, and facilities for this unusually large entering class were quite inadequate. Nevertheless, Course VI was under the leadership of some very able men of whom Dr. Stratton mentioned particularly Dugald C. Jackson, Arthur E. Kennelly, and Frank A. Laws, '89.

In his dedication address Dr. Bush took occasion to welcome friends of M.I.T. and those members in the audience who had been associated with the Department in the past, and mentioned in particular, Redfield Proctor, '02, Ralph G. Hudson, '07, and Richard D. Fay, '17, all of whom are still closely

(*Continued on page 538*)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Dorrance Building Dedicated

THE John Thompson Dorrance Building to house the Departments of Biology and Food Technology at the Institute was dedicated on June 25 at exercises attended by distinguished biologists and food technologists from various parts of the world. George R. Harrison, Dean of Science, presided at the dedication ceremonies at which Oliver G. Willits, Vice Chairman of the Board of the Campbell Soup Company (which provided a large part of the funds for construction of the building) presented it to the Institute. James R. Killian, Jr., '26, President of the Institute, Francis O. Schmitt, Head of the Department of Biology, and Bernard E. Proctor, '23, who heads the Department of Food Technology, accepted the building.

The dedication address was delivered by Detlev W. Bronk, President of Johns Hopkins University and President-elect of the Rockefeller Institute for Medical Research. The dedication exercises were followed by a luncheon, and scientific symposia on "Perspectives in Quantitative Biology" and "Global Concepts of Food Technology."

In accepting the new building on behalf of the Institute, Dr. Killian stressed the importance of the new facilities for the Departments of Biology and Food Technology. "In biology," he said, "the progress now taking place is great in its impact and its promise. New instrumentation techniques and insight are bringing biologists closer to solving the riddle of life itself. Even though they may never solve it, they can enormously advance our understanding of ourselves. Biophysics and biochemistry are making major contributions to medicine and health, and this new building can help to increase the pace of this advance." Speaking of the progress of food technology, Dr. Killian stressed the revolutionary changes that have been brought about in this field. He predicted new discoveries in food technology of the greatest consequence to the future of mankind. "Most of these," he said, "we cannot anticipate, but we can be sure they will come."

Speaking for the Department of Biology, Dr. Schmitt said, "Our Department has been concerned very largely with what might be called 'biology at the molecular level'; with the application to biological problems of the quantitative methods of physics and chemistry. This has proven most profitable and we may confidently predict that advances in this field in the next few decades will far outstrip the past discoveries in their significance for biological science. As we come nearer to an understanding of the detailed structure and composition of proteins, nucleic acids, and other natural large molecules, we draw much closer to a solution of such great problems as the mechanisms of immunology, genetics, growth and development. As we learn more about the biosynthesis of cellular components and about the metabolic reactions which provide the energy to run the molecular machinery of the cell, we hasten the day when real progress will be possible in the control of the degenerative diseases." Speaking of the goals of the biologist, Dr. Schmitt stressed the need for new knowledge of the problem of muscle contraction, of nerve conduction, and the orderly processes of growth and development.

Speaking for the Department of Food Technology, Dr. Proctor recalled the enormous importance of the early work in this field carried on by Dr. Samuel C. Prescott, '94, for many years a leader in methods of food preservation. Speaking of the future, Dr. Proctor outlined some of the stimulating problems in which lie rich promise of great advances in the science of manufacturing and preserving foods. He noted that the new facilities at M.I.T. should contribute to more rapid progress in research on various projects.

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Erwin H. Schell, '12, Head of the Department of Business Administration and Engineering, and a staunch supporter of collegiate sailing, takes a vantage point atop the Sailing Pavilion as Mrs. Schell christens one of the Institute's new fleet of Fiberglas dinghies. Many Technology sailors returned to the Institute on May 9 for the christening ceremonies, and wound up a day of water sports with dinner at the Faculty Club.

Building Construction Becomes Course in Civil Engineering

APPOINTMENT of Albert G. H. Dietz, '32, as Acting Head of the Course in Building Engineering and Construction at M.I.T., has been announced by James R. Killian, Jr., '26, President. Dr. Dietz will succeed Professor Walter C. Voss, '32, who retires this June but who will remain at the Institute as professor emeritus and lecturer.

Beginning July 1, the Course in Building Engineering and Construction will operate as part of the Department of Civil and Sanitary Engineering and its instructing staff will be included in this Department. In making this announcement, President Killian said:

> Because the building construction industry occupies such a vital place in the social and economic structure of our country, it is important that this phase of the Institute's activities be developed to the fullest extent possible. Related as it is to both Civil Engineering and Architecture, it is nevertheless essentially engineering in character. For this reason the course will become affiliated with Civil Engineering, but a close liaison with Architecture will be maintained.

Dr. Dietz was educated at Miami University and at M.I.T., where he was awarded his doctorate in 1941. Appointed instructor in 1938, he was promoted to assistant professor of structural engineering in 1941, associate professor in 1946, and full professor in 1950. During World War II he was on leave of absence from M.I.T. for special work with the Office of Field Service, Office of Scientific Research and Development. For his outstanding service in this connection, Dr. Dietz was awarded a certificate of appreciation from the Army and Navy in 1948. In 1950, he was appointed to the Civilian Defense Organization Committee and the Governor's Advisory Council on Civil Defense in Massachusetts. In June, 1951, Professor Dietz was appointed to a commission on engineering education to go to Japan for consultation with the Japanese Ministry of Education, as recorded in the May, 1952, issue of *The Review*.

Dr. Dietz is a member of the American Society of Civil Engineers and the American Society for Testing Materials. He has lectured extensively and is editor of a book entitled *Engineering Laminates*. He is also the author of *Dwelling House Construction*, and of *Materials: Wood, Plastics, Fabrics*.

Professor Voss joined the M.I.T. staff of the Department of Building Engineering and Construction as an associate professor in 1928. In 1931 he was appointed professor and in 1940 he became head of the Department. He has been a consultant in architectural construction and materials since 1919, and is a licensed architect, master builder, and registered engineer.

Professor Voss is a graduate of the Chicago Teachers College where he was a scholarship student and from the University of Illinois where he received the degree of bachelor of science in architectural engineering with both preliminary and final honors in 1912. He also holds the degree of master of science from M.I.T.

He is coauthor of *Concrete Work, Architectural Construction, Wood Construction,* and *Steel Construction;* author of *Fireproof Construction;* and editor of *Construction Series*. His field of special research interest is masonry materials.

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As guests of Pierre S. duPont, '90, several hundred members of the M.I.T. Club of Philadelphia held their annual meeting, on May 9, at Longwood Gardens, the estate of Mr. duPont. Shown at the festive board, during this magnificent Alumni meeting are (in usual order), Samuel K. McCauley, '41, Secretary of the M.I.T. Club of Philadelphia, Pierre S. duPont, generous and genial host, and Mrs. Samuel McCauley.

Richard S. Mooney

Lowell Commencement

THE 49th graduation exercises of the Lowell Institute School were held at the Institute on Thursday, May 28, at 8:15 P.M.

The principal address was given by Linnell E. Studley, Vice-president in charge of production for the New England Confectionary Company and factory manager of the Cambridge plant. Certificates were awarded by Dr. Ralph Lowell, President of the Boston Safe Deposit and Trust Company, sole trustee of the Lowell Institute School, and a member of the Corporation of M.I.T.

One of the high lights of the program was the eighth presentation of the Charles Francis Park Medal, which bears the name of the first director of the School and was awarded for excellence in the course to James T. Martin, Jr., of Calthrope Road, Marblehead. Mr. Martin, who is president of his class, is a graduate of Marblehead High School and is employed as an apprentice at the General Electric Company in Lynn.

The citation accompanying the Park Medal was read by Francis J. Emery, a graduate of the Lowell Institute School with the class of 1913, and now Director of Industrial Arts for the Boston School Committee. Professor Arthur L. Townsend, Director of the Lowell Institute School and Associate Professor of Mechanical Engineering at M.I.T., presided.

Admiral Edward L. Cochrane, Dean of Engineering at M.I.T., under whose auspices the Lowell Institute School operates, brought the greetings of President James R. Killian, Jr., and the M.I.T. Corporation to the graduates.

In The Emeritus Ranks

E. Buckingham

O. F. Hedlund

R. McG. Lane

J. M. Lessells

E. B. Millard

M. S. Smith

W. C. Voss, '32

FOUR members of the Institute's Faculty, two members of the library staff, and three men closely associated with student extracurricular activities will retire this summer after long service at M.I.T. In alphabetical order the nine are: Earle Buckingham, Professor of Mechanical Engineering; Oscar F. Hedlund, track coach; Sanfrid K. Johnson, athletic trainer; Mrs. Ruth McG. Lane, Vail Librarian; John M. Lessells, Associate Professor of Mechanical Engineering; Earl B. Millard, Professor of Chemistry and Secretary of the Faculty; Wallace M. Ross, Secretary, Technology Christian Association; Miss Marian S. Smith, Reference Librarian; and Walter C. Voss, '32, Head of the Department of Building Engineering and Construction.

Professor Buckingham joined the Department of Mechanical Engineering as associate professor of Engineering Standards and Measurements in 1925. He became professor of Mechanical Engineering in 1931. He will continue next fall as Emeritus Professor of Mechanical Engineering as lecturer in his Department.

Professor Lessells came to M.I.T. in 1936 as associate professor of Mechanical Engineering. He was on leave of absence between 1943 and 1945 for work with the British Ministry of Supply Mission to the United States for consulting work. Professor Lessells will serve his Department next fall as part-time lecturer.

This year Professor Millard ends service to M.I.T. which began with his appointment as instructor of Inorganic Chemistry in 1914. He became assistant professor of Theoretical Chemistry in 1916, associate professor in 1922 and professor in 1929. In addition, from 1922 to 1935 Professor Millard served as assistant director of the Institute's Division of Industrial Cooperation.

Head of the Institute's Department of Building Engineering and Construction since its re-establishment in 1940, Professor Voss came to M.I.T. as associate professor in 1931. In 1931 he became professor and will devote part time, next year, as lecturer in the Department of Civil Engineering.

Miss Smith, a graduate of Simmons College, is the only librarian who has served the library in three different homes – in the Rogers Building in Boston, in the dome of Building 10, and most recently, in the new Hayden Library. With the exception of one year during which she served as technical librarian with the DuPont organization, she has been at M.I.T. since 1912. After July 1, Miss Smith will serve as Reference Librarian Emeritus and will study the Institute's library services to industry.

Mrs. Lane holds degrees from Wellesley College, Simmons College and Harvard University. Although active in several engineering educational and library associations and a frequent contributor to library and engineering literature, Mrs. Lane is best known as guiding spirit in the Vail Library of Electrical Engineering, one of the world's greatest collections in its field. Mrs. Lane becomes Vail Librarian Emeritus and will work with Professor Richard H. Frazier, '23, in a program to extend the effective use of the collection in electrical engineering.

Oscar F. Hedlund, track coach, Sanfrid K. Johnson, athletic trainer, and Wallace M. Ross, for 34 years general secretary of the Technology Christian Association, are well-known to generations of Technology students. All three men retire at the end of the school year with the best wishes of the many students who benefited from their interest and guidance. Photographs of Messrs. Ross and Johnson appear on pages 480 and 494 respectively.

Smith Joins Sloan School

MASON SMITH, since 1940 a partner in A. T. Kearney and Company, Chicago management consultants, has been appointed professor of industrial management in the School of Industrial Management at M.I.T., according to E. P. Brooks, '17, Dean of the School. Mr. Smith's appointment will become effective on June 1. He was formerly director of personnel at Marshall Field and Company in Chicago, and is a past president of the National Association of Cost Accountants.

After receiving the degrees of bachelor of science and master of business administration from the Northwestern University School of Commerce, Mr. Smith served successively on the faculties of the University of Georgia (1925–1926), Northwestern University (1926–1927), and Ohio State University (1927–1929).

From 1929 to 1931 he was assistant secretary of the National Association of Cost Accountants, and from 1931 to 1933 he was assistant professor in the School of Commerce at Northwestern University. He later served as a staff member with James O. McKinsey and Company, management consultants, Chicago (1933–1935); assistant general manager of operations, The Kroger Company, Cincinnati; and director of personnel, Marshall Field and Company, Chicago (1937–1940). Professor Smith has spoken extensively throughout the country, and has contributed numerous articles to professional journals.

Kochne Photo

Mason Smith
Professor of Industrial Management

History and Literature in French

A grant of $19,300 from the Rockefeller Foundation, announced by John E. Burchard, Dean of the M.I.T. School of Humanities and Social Studies, will make possible a unique experimental program to present in a foreign language the two-year basic courses in history and literature at the Institute.

Beginning next fall, up to 10 students entering M.I.T. with complete high school preparation in French may choose to study the first year's program in ancient, medieval, and Renaissance history and literature in the French language, from French source materials.

In 1954–1955, during their sophomore year, these students will continue their studies in French of more recent political, philosophic, and cultural concepts; and a larger group of up to 25 qualified freshmen will begin the first year of the two-year program.

The result, according to William N. Locke, Head of the Department of Modern Languages, "will be the first program in the United States, so far as we know, in which the French language can be studied against the wide background of a full cultural curriculum. We will provide a course of unusually high intellectual maturity to challenge the especially qualified of our entering students," he says.

The new program will be administered jointly by the Departments of Humanities and Modern Languages. Close co-operation between them, Dean Burchard believes, will be necessary to the success of the program.

Only students who appear to be adequately prepared for the program, and who volunteer to participate in it, will be assigned to the French language courses. They will cover the same subjects as those in the regular sections in the humanities curriculum conducted in English and will be fulfilling the humanities requirement of all M.I.T. students. Students who wish to switch from French to English language sections will be able to do so at any time during the year.

All lectures will be given in French, and materials which are used in English translations by the regular sections will be assigned in French translation for the experimental group. But the class discussions will be in English, and students will write their papers and examinations in English – at least during the first several months of the two-year program. This seems necessary, according to Professor Locke, to assure that the language will not be a barrier to the students' full comprehension of the course material.

During the last two years at M.I.T., while concentrating their work in one of the Institute's 20 fields of science, engineering, management, or architecture and city planning, these students may continue their French language studies by choosing from several courses in French literature offered in the Department of Modern Languages.

The student who makes this choice, Professor Locke believes, will have "the equivalent of a very fine major in French as well as his professional major in a science or engineering field, in the time usually required to achieve only one of these goals."

U. S. Navy Photo

Washington Regatta

The Nation's Capital was the scene of the Eighth Annual Eastern Association of Rowing Colleges in which 32 crews from 13 colleges took part in the heavy-weight spring championships. the Institute's junior varsity and varsity crews came in fifth and sixth in the morning heats but an improvement of but 10 seconds would have made them winners. Shown, left to right, are Rudolph Kaufmann, Washington Evening Star; *Captain Elliot W. Parish, Jr., U. S. Navy; Rear Admiral A. H. Van Keuren, '07, President, Washington Rowing Association; Edward J. Kelly, Director, Washington Rowing Association; and Robert K. Thulman, '22, representing the Washington M.I.T. Alumni Club. Trophies, left to right are Evening Star trophy, Richard Glendon trophy and the Rowe Cup, established by Charles Hayden, '90, in honor of the late Dr. Allan Winter Rowe, '01.*

Management Fellowships

THE award of 10 fellowships for graduate study in the School of Industrial Management at the Institute during 1953–1954 has been announced by E. P. Brooks, Dean of the School. The awards were made to students with undergraduate degrees in science, engineering, or engineering administration who appeared to the awards committee to have great potential for future leadership in business. This decision, Dean Brooks said, was based upon such factors as outstanding scholastic performance, demonstrated initiative and leadership ability, evidence of high moral and ethical standards, and favorable personality traits.

The fellowships will include full tuition in the School, and some carry additional cash stipends of up to $2,100 for married men and $1,400 for single men.

Three fellowships are continued for 1953–1954 to students who have been Fellows in the School during the current year: John Davidson, B. Sc., (in Mechanical Engineering), University of Durham, England; University of Kansas; James C. Emery, B. Sc. (in Chemistry), University of Arkansas; Winston R. Hindle, Jr., B.A. (in Physics), Amherst College.

Seven Fellows will begin work under the fellowship program in the School of Industrial Management in September, 1953: Charles L. King, B.E. (in Chemical Engineering), Vanderbilt University; Gerard J. Kirchner, B. E. (in Industrial Engineering), Johns Hopkins University; Bernard Lachapelle, B.A.Sc. (in Civil Engineering), Engineer, Ecole Polytechnique, University of Montreal. Jawahar I. Mehta, B.Sc. (in Chemistry), Gujarat College; B.Sc. (in Chemical Engineering), University of Bombay, B.M.E. (in Management Engineering), Rensselaer Polytechnic Institute. Roger K. Olen, B.Sc., B.E.E., University of Minnesota. Zenon S. Zannetos, B.A. (in Mathematics), University of Kansas. Frederick Zwerling, S.B. (in Business and Engineering Administration), M.I.T.

R.O.T.C. Awards

THIRTY outstanding cadets of the Departments of Military Science and Air Science at the Institute were given R.O.T.C. awards and medals at a Military Review held May 14, on Briggs Field. James R. Killian, Jr., '26, was the Reviewing Officer.

Important dignitaries in the reviewing stand with Dr. Killian included Major General Roderick A. Allen, U.S.A. Commanding General, Fort Devens and Boston Army Base; Major General R. C. Maude, U.S.A.F., Commanding General, Cambridge Research Center; Brigadier General Charles E. Loucks, Cal C, Deputy Chief Chemical Corps, Washington, D.C.; Colonel Bernard F. Hurless, Infantry, Commandant, A.S.A. Training Center, Fort Devens; Colonel Leo A. Bessette, Infantry District Chief, Massachusetts Military District, Army Base, Boston; and John E. Burchard, Dean of Humanities and Social Studies, M.I.T.

Also in the reviewing stand were Colonel Charles F. Baish, '21, Professor of Military Science, Glenn C. Coleman, Professor of Air Science, M.I.T.; Paul F. Hannah, Vice-president of Raytheon Corporation, Waltham; Brigadier General James F. McManmon, U.S.A.F. retired; Colonel Francis E. Kidwell, Sig. C, Signal Officer, First Army, Governors Island, New York; Edwin T. Morrell, Secretary, Massachusetts Wing, A.F. Association; Philip Foss Lackey, Secretary, S.A.R., Boston; and Major Raymond T. Palmer, U.S.A.F. Reserve.

Cadet Colonel Stanley Lenard, Chemical Corps, Army, and Cadet Lieutenant Colonel Gilbert D. Gardner, Air Force, received respectively, the Reserve Officers Association Senior Army Cadet medal and Senior Air Force Cadet medal for military and academic achievement. Cadet Lieutenant Colonel Ralph H. Sievers, Jr., Corps of Engineers, Army, and Cadet Colonel Leroy G. Malouf, Air Force, received respectively, the Senior Army Cadet medal and the Senior Air Force Cadet medal for general excellence.

East Meets West in Sailing

The first sailing for the Sir Thomas Lipton Memorial Trophy was held on the Charles River Basin in the new M.I.T. Fiberglas dinghies on Monday, June 22. The Lipton Trophy is a new trophy which was given to the Intercollegiate Yacht Racing Association of North America by Robert Bartly Smallwood, President of Thomas J. Lipton, Inc. Karl T. Compton, Chairman of the M.I.T. Corporation, acted as intermediary in the acceptance of the gift at the February meeting of the New England branch of the Intercollegiate Yacht Racing Association. The trophy is for intersectional racing between the four geographical regions of the United States, and will be held each year in connection with the national championships. In 1953 the national championships were held on June 17, 18, and 19 at the U. S. Merchant Marine Academy, Kings Point, New York. Harvard was the winner of this event, and M.I.T. was tied for second place with the U. S. Naval Academy midshipmen from Annapolis. The two teams from the Pacific Coast – Claremont-Pomona Colleges and Stanford University – travelled to Boston to meet Harvard and M.I.T. for the Lipton Trophy. The New England teams took all four of the matches – four out of seven series. As photographed at the M.I.T. Sailing Pavilion, sailors who took part in the June 22 races are (back row, left to right): Horatio Garcia, '54, M.I.T., George Robertson, Harvard, Kimberly Munholland, Claremont-Pomona Colleges, Charles Merrill, Stanford, Bruce Young, Claremont-Pomona Colleges; (front row, left to right): James Nathanson, Harvard, Edward M. Melaika, '53, M.I.T., Llewellyn Boxby, Claremont-Pomona Colleges, and Paul Merrill, Jr., Stanford. The Merrill brothers are sons of Paul C. Merrill, '22.

Ship Models and a Liberal Education

EDWIN D. RYER, '20, President of the Alumni Association, called to order the 296th meeting of the Alumni Council at the Faculty Club, on Monday, April 27, at which 122 members and guests were present.

Donald P. Severance, '38, Secretary, reported that the Audit and Budget Committee and the Executive Committee had approved a budget of $41,097 for the coming fiscal year; that the ballots for officers of the Alumni Association had been counted (with results as indicated on pages 514 and 550); and that during April, seven members of the M.I.T. family had visited six M.I.T. clubs as far as Milwaukee and Detroit.

As Director of the Alumni Fund, Henry B. Kane, '24, reported that 8,915 Alumni had contributed $189,000, and that there is every reason to believe that the previous total of $206,600 will be exceeded. President Ryer also announced plans for Alumni Day, the events themselves of which are recorded beginning on page 499 of this issue of *The Review*.

James R. Killian, Jr., '26, President of M.I.T., was then called on to advise Council members on recent happenings at the Institute. Dr. Killian discussed the statement, issued by the American Association of Universities and to which M.I.T. is a signatory, setting forth policies with regard to academic freedom and Communism in institutions of higher learning. President Killian also discussed the problem which M.I.T. had to face when three of its Faculty members appeared in open meeting before the House Committee on Un-American Activities. A more detailed report on this subject appears on page 540 of this issue.

Edward L. Cochrane, '20, Dean of the School of Engineering and former Head of the Department of Naval Architecture and Marine Engineering, then introduced Professor Laurens Troost, present Head of that Department, who spoke on "25 Years of Ship Model Basin Work." In reviewing progress which has been made through the use of ship model tanks in the past quarter century, Professor Troost recalled that there had been a 25 per cent increase in efficiency due to hydrodynamic design, an increase of 15 per cent efficiency through substitution of welded for riveted hulls, and a 30 per cent improvement in fuel consumption of steam turbine installations, while use of aluminum alloy superstructures has made a 10 per cent saving in weight. The net effect is that smaller, lighter, narrower ships, requiring less power for a given speed, can now be built. This was illustrated by comparing the performance of the British ship, the *Queen Mary*, with the American vessel, the *United States*. Professor Troost pointed out the need for correlating data made in small tanks with data obtained on full-scale ships, so that small tanks could make greater contributions to marine engineering.

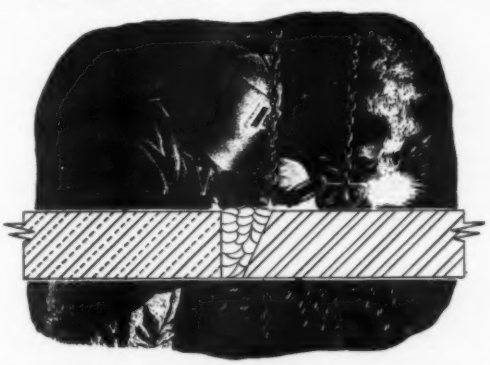
Final speaker of the evening was John E. Burchard, '23, Dean of the School of Humanities and Social Studies, who spoke on the liberal education of a specialist. Dean Burchard emphasized that the Institute has a first-class Faculty in the humanities, and pointed out that Technology students are required to take a co-ordinated humanities program for four years at the Institute, and mentioned that M.I.T. students are definitely above the national norm in ability to read with comprehension, but are somewhat below in variety and extensiveness of vocabulary.

(*Continued on page 514*)

BUSINESS IN MOTION

To our Colleagues in American Business . . .

Late last year an important customer surprised us with an emergency call for help. It is a large company, and an unusually capable fabricator, so it is seldom indeed that it asks us for more than metals. Now it was not only having trouble, but was fast approaching a penalty period of $2,400 a day for failure to deliver. The difficulty arose in butt-welding aluminum bronze to steel, so two of the men from the Welding Section of the Revere Research Department assembled their equipment and left at once. They found that the test specification called for welding 1½ inch plates, and then making a side bend without damage. This had nothing to do with the stress conditions which the pressure vessel would experience in service, but there it was, and welders had to be qualified by that test. Nobody had been able to pass it, which was why we were asked for collaboration.



• Working closely with the customer, and with the inspectors assigned to approve the work, our welding engineers dug deep into this problem. On Saturday, Sunday and Monday five test plates were made, each showing a definite improvement, though extreme difficulty was experienced in getting a satisfactory joint at the root of the weld. This was due to the fact that the design called for a 25-degree bevel on the steel plate, and no bevel on the aluminum bronze. Good fusion was impossible at the root, as was proved when the bottom of a test piece was cut off; the upper three-quarters of the weld then made the side bend satisfactorily.

• After close mutual analysis of the problem, permission was obtained to open the joint to a 60-degree angle, to correspond with the joint of the actual vessel. The following day welds of the joint were made without difficulty, and passed the severe test without question. The remainder of the week was occupied in setting up the welding equipment we selected, and instructing the customer's welders in the necessary procedures. One of the methods recommended involved the placing of the beads of weld metal. Small beads were advised, and after each layer had been laid it was carefully power brushed to remove any oxides which otherwise might have caused planes of weakness.

• In all this work it was evident that our men were so obviously familiar with what they were doing, and with the practical limitations and opportunities of the job, that they were able to bring the customer and the inspectors together in a mutual meeting of minds, by showing how to make a weld which would withstand the test. Production began to meet schedules thereupon, just in time to avoid the $2,400 daily penalty.

• Revere finds that operating a welding service of this kind is good business. It increases our contributions to American industry, and is in line with the recommendations we have given in these pages for many years. Namely, that you take full advantage of the knowledge of your suppliers, as well as buy their materials. No matter what you purchase, nor from whom, there must be one or more firms by whose experience you can profit, if you will just ask for it.

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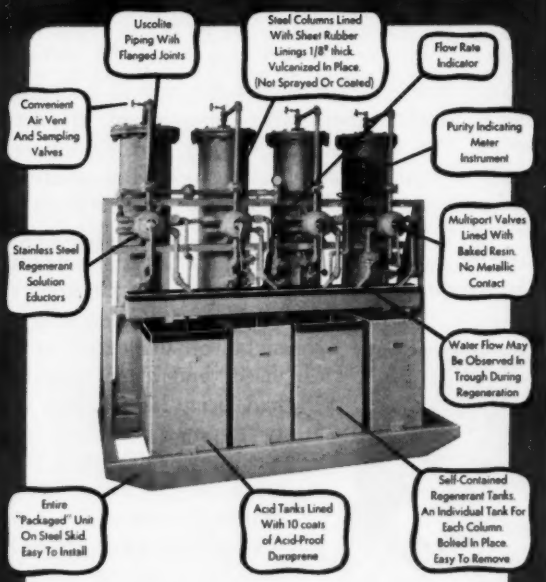
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Convenient Air Vent And Sampling Valves
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Multiport Valves Lined With Baked Resin. No Metallic Contact
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THE INSTITUTE GAZETTE

(Continued from page 512)

Plans for an Auditorium

LAST Alumni Council Meeting of the present school year was called to order at 7:45 P.M. on Monday, May 25, at the M.I.T. Faculty Club, by Edwin D. Ryer, '20, President of the Alumni Association. At this 297th meeting, business was the order of the day for the 114 council members who listened to reports by Donald P. Severance, '38, Secretary and Treasurer, and H. E. Lobdell, '17, Executive Vice-president of the Alumni Association.

As first order of business, it was reported that between April 29 and May 25, seven members of the Institute's Faculty and staff had visited 12 M.I.T. Clubs within the area bounded by Toronto, Canada, Minneapolis, Duluth, St. Louis, and Philadelphia.

It was reported that, at its afternoon meeting, the Executive Committee voted the following committee nominations for Alumni Council consideration: *Audit and Budget:* Edwin D. Ryer, '20, C. George Dandrow, '22; *Boston Luncheon Club:* Robert L. Johnson, '38, Chairman, Chenery Salmon, '26, Vice-chairman, Vincent T. Estabrook, '36, Secretary-Treasurer; *Class Reunions:* Clarence R. Westaway, '33, William H. Carlisle, Jr., '28, Chairman; *Friends of the M.I.T. Library:* Ralph T. Walker, '11, Chairman, Henry L. Seaver, Staff, Harry H. Young, '91, Oscar H. Horowitz, '22, Melville Eastham, Caryl P. Haskins, Edward H. Davis, '01, Carl F. Muckenhoupt, '24; *Honorary Members:* Donald G. Robbins, '07, Samuel C. Prescott, '94, Chairman; *Advisory Councils:* Louis H. Flanders, Jr., '33, Chairman, Percy Bugbee, '20, Albert O. Wilson, Jr., '38, David W. Skinner, '23; *Departmental Visiting Committees:* Garvin Bawden, '21, James Donovan, '28, Raymond Stevens, '17, Chairman; *Alumni Council Representatives of M.I.T. Clubs:* Chenery Salmon, '26, Gilbert M. Roddy, '31, G. Raymond Lehrer, '24, Eric A. Bianchi, '29, Louis Rosenblum, '42, Chairman; *Personnel Committee:* William R. Jones, '49, Donald P. Severance, '38, Chairman.

The Executive Committee approved recommendations of the Alumni Fund Board that this year's balance of the Alumni Fund be added to the balance now in the custody of the Treasurer of the Institute. This will bring the cumulative unexpended total to approximately $250,000.

Names submitted by the Committee for Nominations for Departmental Visiting Committees were also approved. As chairman of the Alumni Day, George W. McCreery, '19, reported on plans for the Alumni Day program. Instead of reporting those plans here, readers may find the record of accomplishment on pages 499 to 506 of this issue of The Review.

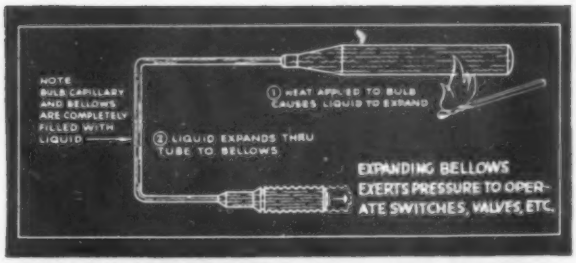
Mr. Ryer next called on President Killian who discussed the basic plan of M.I.T.'s physical plant. Consummation of present plans will result, ultimately, in the East Campus being devoted to education and research and the West Campus to living and recreational facilities. These remarks led very naturally to President Killian's warm introduction of Robert M. Kimball, '33, Director of Business Administration for

(Continued on page 516)

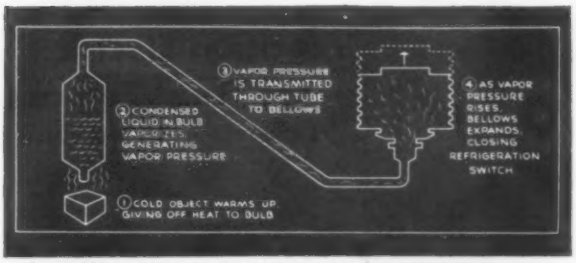
8 ways

Clifford bellows help you solve design problems

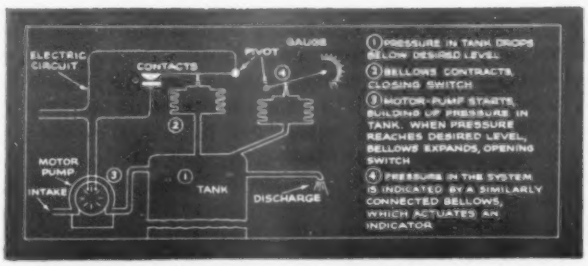
Perhaps you, too, can benefit from flexible, leakproof, metallic Clifford bellows assemblies. For individual requirements in assembling bellows to fittings, Clifford is equipped to use new molecular bonding processes, resistance welding and heliarc-welding. Write direct for complete details on how Clifford bellows assemblies can help you. Clifford Manufacturing Company, 142 Grove Street, Waltham 54, Massachusetts. *Division of Standard-Thomson Corporation.* Sales offices in New York; Detroit; Chicago; Los Angeles; Waltham, Mass.


NOTE
BULB CAPILLARY AND BELLOWS ARE COMPLETELY FILLED WITH LIQUID
① HEAT APPLIED TO BULB CAUSES LIQUID TO EXPAND
② LIQUID EXPANDS THRU TUBE TO BELLOWS
EXPANDING BELLOWS EXERTS PRESSURE TO OPERATE SWITCHES, VALVES, ETC.

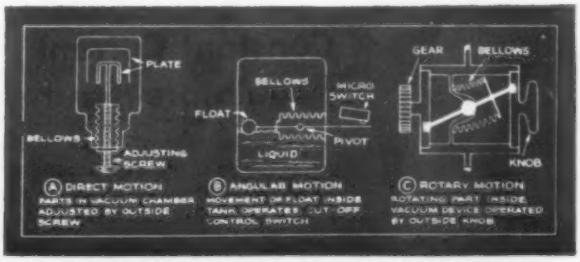
Controlling wide range of temperature with one adjusting device. Liquid filled Clifford bellows assembly permits one knob to adjust temperatures by remote control from 200° to as high as 650° or 700°. Common applications: domestic and industrial oven controls.


① COLD OBJECT WARMS UP, GIVING OFF HEAT TO BULB
② CONDENSED LIQUID IN BULB VAPORIZES, GENERATING VAPOR PRESSURE
③ VAPOR PRESSURE IS TRANSMITTED THROUGH TUBE TO BELLOWS
④ AS VAPOR PRESSURE RISES, BELLOWS EXPANDS, CLOSING REFRIGERATION SWITCH

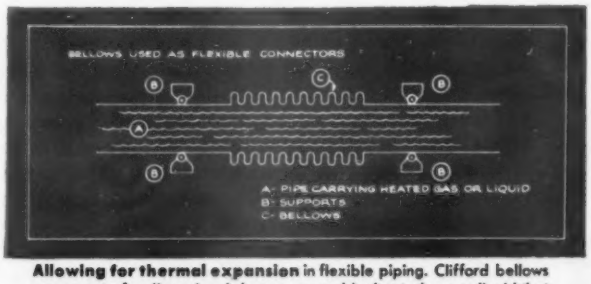
Controlling narrow range temperatures. Vapor pressure Clifford bellows system forms temperature control unit used in thermostatic devices. This device can be designed to be "fail safe" to prevent overheating even if bellows fails to function. Adjustment commonly limited to lower range than liquid filled system. Applications: refrigerator controls, auto thermostats, tank regulators.


ELECTRIC CIRCUIT
CONTACTS
PIVOT
GAUGE
MOTOR PUMP
INTAKE
TANK
DISCHARGE
① PRESSURE IN TANK DROPS BELOW DESIRED LEVEL
② BELLOWS CONTRACTS, CLOSING SWITCH
③ MOTOR-PUMP STARTS, BUILDING UP PRESSURE IN TANK. WHEN PRESSURE REACHES DESIRED LEVEL, BELLOWS EXPANDS, OPENING SWITCH
④ PRESSURE IN THE SYSTEM IS INDICATED BY A SIMILARLY CONNECTED BELLOWS, WHICH ACTUATES AN INDICATOR

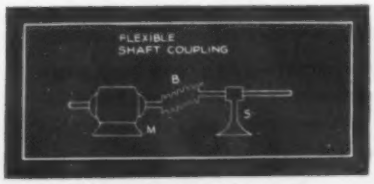
Controlling and/or indicating pressure. Clifford Hydron bellows assemblies provide close control and accurate indication in pressure systems. Pressure, exactly equal throughout the system, is immediately exerted on bellows which respond without lag. Common applications: instruments to control temperature, pressure, flow rates, liquid level.



Transmitting motion from one medium to another while maintaining a hermetic seal. The inherent flexibility of leakproof Clifford Hydron bellows permits extension, retraction, rotary motion or combinations of these to be applied while hermetically sealing unit's internal elements. (A) shows direct motion, (B) shows angular motion, (C) shows rotary motion.

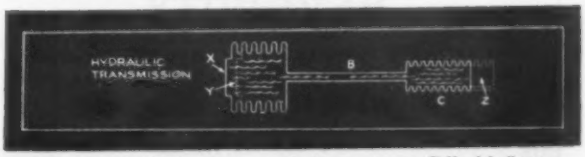


Allowing for thermal expansion in flexible piping. Clifford bellows compensate for dimensional changes caused by heated gas or liquid that would expand and buckle ordinary piping . . . without imposing excessive strain on supports. Sidewise movement of supports with respect to each other is also permitted.



Operating as flexible shaft coupling. Clifford bellows assemblies provide constant velocity torque and compensate for misalignment.

Operating as shaft seal. Clifford bellows seal in gases and liquids and prevent leakage around rotating shafts.



Operating in hydraulic transmission systems. Clifford bellows approximate frictionless lever-action for transmitting force in remote control systems.

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Harold E. Koch, '22, President
Elton E. Staples, '26, Vice President

(*Continued from page 514*)

the Institute, who outlined the planning of the Kresge Auditorium for which construction was begun, west of Massachusetts Avenue on land adjacent to Bexley Hall. The new structure will provide a main auditorium seating 1,200 persons, and a smaller auditorium seating 200 persons. Facilities will also be provided for dressing rooms, rehearsal rooms, stage settings, and the building is so constructed that a parking place for 400 automobiles can be provided. The most unusual feature of the structure designed by Eero Saarinen is its spherical triangular shape, which eliminates columns and requires a minimum of steel. A committee representing points of view of the administration, the students, the various groups who are expected to make the greatest use of the auditorium, together with specialists in architecture, heating and ventilating, and air conditioning, have given the structure careful study. Accordingly, it is anticipated that the new auditorium will be eminently successful in meeting a pressing Institute need for a suitable meeting place for groups larger than can be accommodated in Huntington Hall.

Final speaker of the evening was Jacob Brownowski, Carnegie Professor of History, who is on leave from his post as director of research for England's coal industry. Professor Brownowski expressed his appreciation at the opportunity to visit the Institute and stated that his work in England was primarily concerned with obtaining first class scientific personnel to work on research problems for the coal industry. Industrial research in England, he said, does not have the status which it enjoys in the United States, and while personnel is available for academic posts, British industries do not ordinarily attract first class scientists.

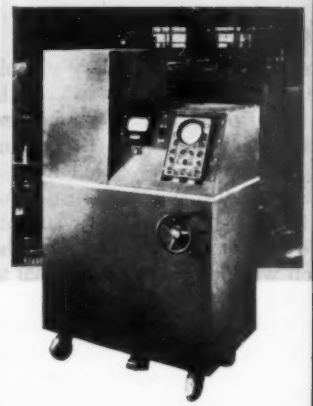
Choral Group

THE 20th anniversary of the Technology Matrons' and Dames' Choral Group was celebrated Friday evening, May 15, with an invitation concert and reception at the M.I.T. Faculty Club.

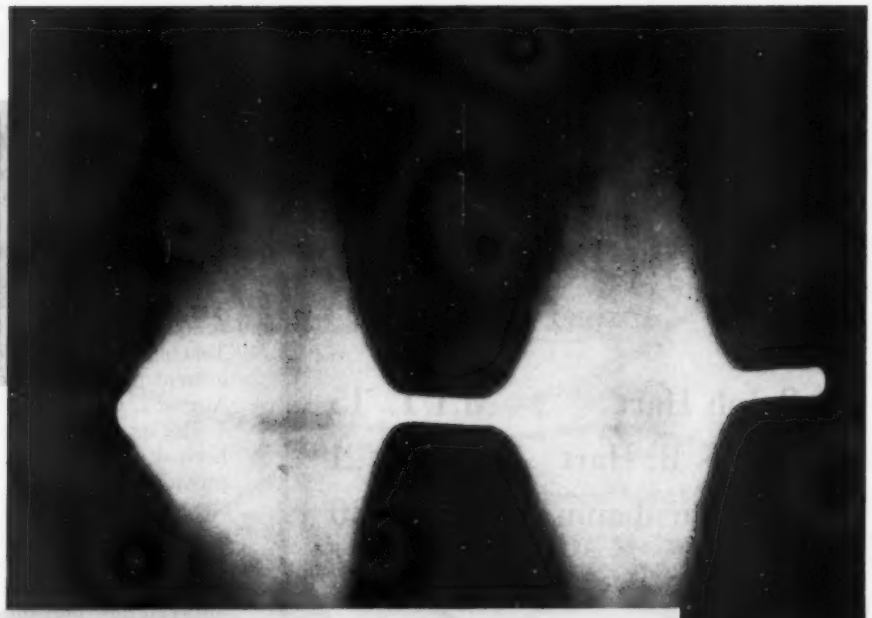
The choral group's 38 members are wives of both students and staff at M.I.T. and include guest members from the Harvard Dames and Harvard Newcomers Association. Participating in the spring concert were two active charter members of the society. Mrs. George Scatchard, Associate Professor of Music at Smith College, is chairman and director; and Mrs. Wallace M. Ross is accompanist. Guest artists at the concert on May 15 were Mrs. William Weems, violinist, and Mrs. Archibald Adkins, pianist. Soloists for the choral group are Mrs. Albert Dietz, Mrs. Richard Lawrence, Mrs. Donald McLean, and Mrs. O. William Leidel.

This year the Technology Matrons' and Dames' Choral Group has sung at the Baptist Church, Brookline; the Harvard Women's Association of Greater Boston; the Metropolitan and Massachusetts General hospitals; the Matrons' Christmas Tea at the home of President and Mrs. James R. Killian of M.I.T.; and at a meeting of the Harvard Dames.

(*Continued on page 518*)



Specially designed ionization detector for routine factory use measures corona level of all-insulated cables rated at 3000 volts or over.



Why Rome's corona level testing assures cable dependability

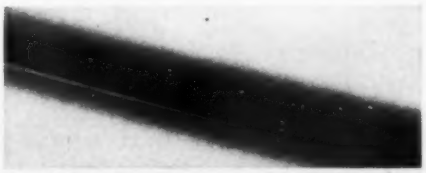
The picture above means trouble. It is an oscilloscope trace of internal ionization in an insulated cable.

Ionization is caused by the electrical break-down of air in pockets within the insulation, or between the insulation and conductor or shield. Should this ionization occur at a value below the operating voltage of the cable, several destructive electrical effects may occur such as possible ozone cutting, reduced dielectrical strength, and a substantial increase in dielectric losses. Any of these hazards could result in early failure or reduce the efficient performance life of the cable.

Ionization is particularly dangerous because it cannot be detected by the ordinary visual, physical and electrical testing methods usually applied to cable.

So, to prevent guesswork, to assure you of maximum protection against ionization, *every foot of Rome insulated cable, rated at 3000 volts or over, is thoroughly tested by a specially designed ionization detector.* This instrument accurately measures the corona level of the entire cable. Unless the ionization voltage exceeds the intended operating voltage, the cable is rejected.

This is one more extra step in Rome Cable's standard manufacturing procedure that assures dependability. This completely new *NONDESTRUCTIVE* method of testing was developed by Rome Cable engineers and was first described in AIEE paper 48-198, "The Measurement and Investigation of Ionization Level of Rubber Insulated Cables," presented in August, 1948. A copy is yours for the asking.



This X-ray reveals loose insulation—a major cause of ionization.

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THE INSTITUTE GAZETTE

(*Continued from page 516*)

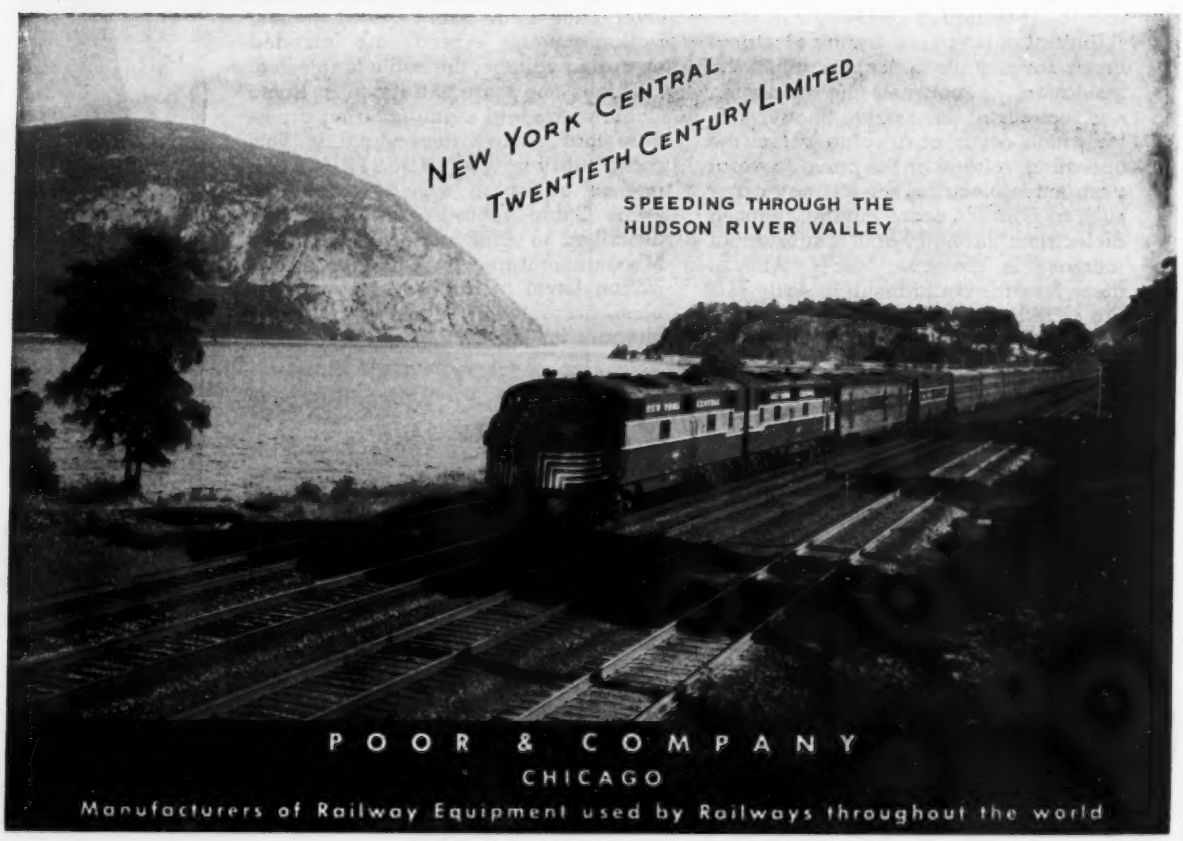
Science for High School Teachers

FIFTY-FOUR science teachers from secondary schools in 26 states and the province of Alberta in Canada were named on May 2 as winners of Westinghouse Fellowships to a special summer program at the Institute. The fellowships have been awarded from a grant established in 1949 by the Westinghouse Educational Foundation to provide 50 M.I.T. Science Teachers Fellowships each summer for five years. The current program, which will extend from June 29 to August 7, is the fifth in the series.

The special program for the fellowship winners has been designed by a Faculty committee at M.I.T. to provide a survey of recent developments in many of the sciences and to review, through special lectures in physics and chemistry, pertinent relationships between high school and college science courses. One of the high lights of the program will be a series of informal meetings for discussion of the problems and methods of teaching science.

The fellowship winners will also review recent scientific developments in such subjects as cosmic rays, nuclear physics, high-energy accelerators, radioactive tracers, large molecules, biological effects of radiation, artificial stimulation of rain, and problems of supersonic flight.

(*Continued on page 520*)



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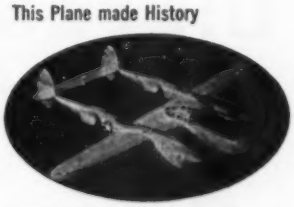

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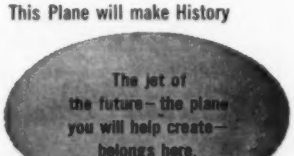

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THE INSTITUTE GAZETTE

(*Continued from page 518*)

Rumford Bicentennial

THE Institute celebrated the 200th anniversary of the birth of Count Rumford in Woburn, Mass., during a special summer program in thermodynamics from June 29 to July 10.

Count Rumford was born as Benjamin Thompson in Woburn in 1753. He performed experiments on the generation of heat during the firing of cannon, and his conclusions were among the first theories of what has now become the science of thermodynamics.

Four members of the M.I.T. Faculty gave the principal lectures in the program: Joseph H. Keenan, Professor of Mechanical Engineering; Melvin A. Herlin, Assistant Professor of Physics; James A. Beattie, Professor of Physical Chemistry; and Laszlo Tisza, Associate Professor of Physics.

Lars Onsager, Professor of Theoretical Chemistry at Yale University, was one of a number of special lecturers who participated in the summer program. Other members of the Institute's Faculty who also served as special lecturers are: Edwin R. Gilliland, Professor of Chemical Engineering; Walter H. Stockmayer, Professor of Physical Chemistry; Sanborn C. Brown, Associate Professor of Physics; Clark C. Stephenson, Associate Professor of Chemistry; and H. Guyford Stever, Associate Professor of Aeronautical Engineering. (*Continued on page 522*)

The Alumni Association of the Massachusetts Institute of Technology has the honor to announce for delivery in the autumn of 1953 a set of eight dinner-service plates bearing original designs by Samuel Chamberlain of the Class of 1918, and fashioned from hand-engraved copper plates by Josiah Wedgwood and Sons, Ltd., of Barlaston, Staffordshire, England, in Wedgwood Queen's Ware or Bone China. Your inquiry addressed to the Alumni Association, Room 1-280, M.I.T., Cambridge 39, Massachusetts, will bring complete details.

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THE INSTITUTE GAZETTE

(*Continued from page 520*)

Overseas Fellowships

THE award of 25 Overseas Summer Fellowships to graduate students at M.I.T. has been announced by Professor Norman J. Padelford, Chairman of the Institute's Foreign Study Committee. Under this program for overseas professional experience in science, engineering, and architecture, the M.I.T. Fellows will work in seven European countries this summer.

Dr. Padelford explained that the purpose of these fellowships is to enrich graduate training by combining a period of professional experience with residence and observation in a European country. While becoming familiar with specialized scientific thinking and developments in Europe, students gain a more complete understanding of economic and social conditions abroad and America's relationship to them.

Under this plan students take positions in leading European research laboratories, industrial firms, and universities.

The Fellows, and the institutions where they will be located this summer follow:

Robert C. Bertelson, G. V, Mo and Domsjo Company, Ornskoldsvik, Sweden.

Amar G. Bose, G., VI, Philips Electric Company, Eindhoven, Netherlands.

Moise H. Goldstein, Jr., '51, VI, ASEA Company, Servo-Technics Laboratory, Vasteras, Sweden.

(*Continued on page 524*)

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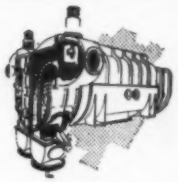

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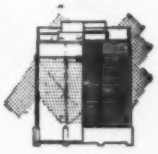

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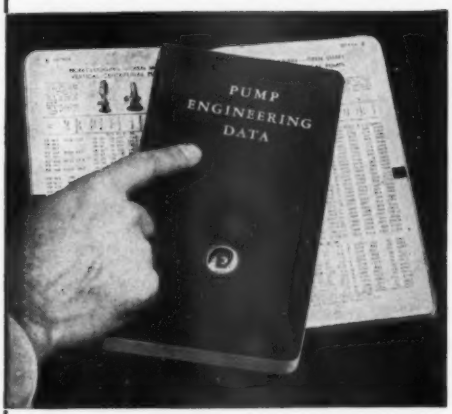

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(*Continued from page 522*)

Ernest E. Huber, Jr., '51, VIII, Metallographic Institute, Stockholm, Sweden.

Charles W. Johnson, G., XVII, Danish National Institute of Building Research, Copenhagen, Denmark.

Howard K. Larson, G., II, De Laval Steam Turbine Company, Stockholm, Sweden.

Philip J. Luth, G., IV-A, Grenfell, Baines and Hargreaves, Lancashire, England.

Alan L. McWhorter, G., VI, Philips Electric Company, Eindhoven, Netherlands.

James K. Mitchell, G., I, Norwegian Geotechnical Institute, Oslo, Norway.

James G. Nelson, G., VI, ASEA Company, Rectifiers Laboratory, Ludvika, Sweden.

Arthur S. Obermayer, G., V, Chalmers Technical University, Gothenburg, Sweden.

John F. O'Donnell, G., X, French Petroleum Institute, Paris, France.

John L. Preston, G., VI, English Electric Company, Stafford, England.

Hugo S. Radt, Jr., G., XVI, Aeronautical Research Institute, Stockholm, Sweden.

George S. Reichenbach, G., II, John Thompson Ltd., Wolverhampton, England.

Lieutenant Virgil W. Rinehart, G., XIII-A, The Lindholmen Shipyard Company, Gothenburg, Sweden.

(*Continued on page 526*)

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J. R. Clark, Ass't. Chief Engineer	1929		
H. B. Gibbons	1929	D. E. Robison	1946
W. C. Schoolfield	1932	L. B. Wadel	1946
H. A. Wood	1934	N. V. Mumford, Jr.	1947
J. B. Schliemann	1936	D. B. King	1948
G. H. Swan	1939	A. L. Lang, Jr.	1948
B. C. Scott, Jr.	1941	J. Jonsen	1949
W. R. Foley	1942	A. B. Bower	1951
C. A. Lau	1942	W. G. Redmond, Jr.	1951
J. E. Stevens	1944	A. W. Shaw	1951
G. T. Upton	1945	W. G. Stanfield	1951
A. F. Litchfield	1946	J. J. Welch, Jr.	1951

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THE INSTITUTE GAZETTE

(*Continued from page 524*)

Roy W. Roth, G., V, Mo and Domsjo Company, Ornskoldsvik, Sweden.

Henry H. Rowe, Jr., G., II, Aeronautical Research Institute, Stockholm, Sweden.

John I. Smith, G., VI, English Electric Company, Marconi College, Chelmsford, England.

Stuart W. Stein, G., IV-B, Riley and Neusum, Lincoln, England.

Steven M. Sussman, G., VI-A, Philips Electric Company, Eindhoven, Netherlands.

David S. Swanson, G., X, Swedish Institute for Food Preservation Research, Gothenburg, Sweden.

Arthur S. Tingas, '53, II, Swedish Textile Research Institute, Gothenburg, Sweden.

James K. Watson, G., VI, ASEA Company, High Tension Laboratory, Ludvika, Sweden.

Watt W. Webb, '47, XV, Metalwerke Plansee, Austria.

Ellen King Memorial Prize

THE Ellen King Memorial Prize for excellence in written composition has been awarded this year to Kevin J. Forsberg, for the best essay written by a freshman as part of his work in a first-year subject or as an extra-curricular composition.

Mrs. King, whose name the award commemorates, was a friend and advisor to generations of Tech students—first in Boston and then in Cambridge, where she was in charge of the Walker Library. The Memorial Prize, which is a collection of books, was established in 1951 from funds contributed by Mrs. King's daughters, Mrs. Luis de Florez and Miss Edith King.

Last year's prize winner was Robert J. Kolenkow, a sophomore in Course VIII.

Record Employment Opportunities

MEMBERS of the Class of 1953, graduated from the Institute on June 12, left M.I.T. with professional opportunities in science and engineering unequalled by any class in the history of M.I.T. Except for 250 graduates who will join the armed services as officers for two years, the graduating class scattered to all parts of the world.

(*Continued on page 528*)

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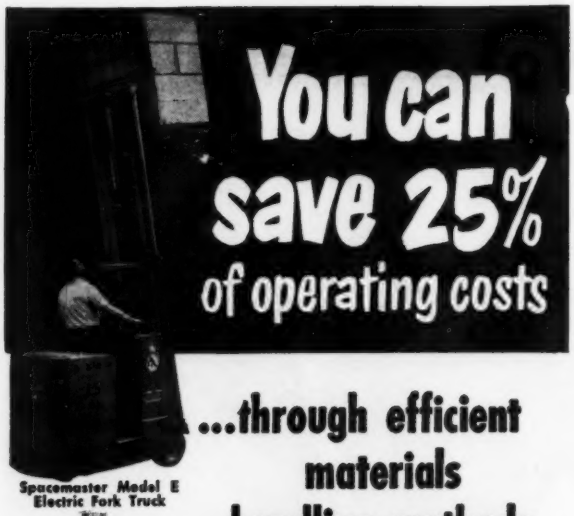

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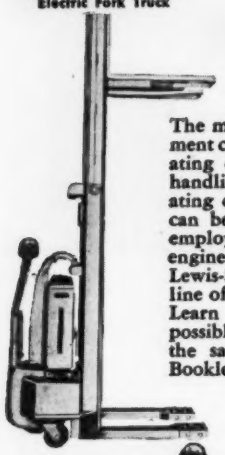

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THE INSTITUTE GAZETTE

(*Continued from page 526*)

Fulbright Awards

THE Fulbright Committee at the Institute has received from the United States Department of State notice of the award of scholarships for foreign study to the following 15 M.I.T. students and graduate students:

John H. Austin, G., Delft Institute of Technology, Netherlands.

William G. Blanding, '53, Institute of Technology, Norway.

William F. Brace, G., University of Innsbruck, Austria.

Edward S. Cohen, G., Delft Institute of Technology, Netherlands.

Richard C. Donkervoet, G., Delft Institute of Technology, Netherlands.

Lawrence Gould, G., University of Paris, France.

David A. Grossman, G., Higher Institute of Architecture, Venice, Italy.

Sidney W. Hess, '53, Delft Institute of Technology, Netherlands.

Morton S. Hoppenfeld, '52, University College, the University of London, England.

Lloyd G. Hyman, '53, University of Birmingham, England.

(*Concluded on page 530*)

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S. K. LANDGRAF	BS(AE) 1947	DESIGN ENGINEER
J. C. McALLISTER	BS(EE) 1950	DESIGN ENGINEER
R. CASSIDY	BS(CE) 1952	TEST ENGINEER

HELICOPTER ENGINEERING:

R. B. WOODWARD	BS(AE) 1949	DESIGN ENGINEER
C. H. HURKAMP	BS 1927	CHIEF, HELICOPTER DIVISION
J. J. MAZZONI	BS(CE) 1931	SENIOR DESIGN ENGINEER

MISSILES ENGINEERING:

B. G. BROMBERG	ScD 1947	CHIEF, MISSILE DIVISION
A. L. LOWELL	BS(AE) 1941	CHIEF, AERODYNAMICS
A. R. KRENKEL	MS(AE) 1949	SENIOR DESIGN ENGINEER
J. W. TWOMBLY, JR.	BS(EE) 1950	DESIGN ENGINEER
W. I. HARRIS	BS(EE) 1950	DEVELOPMENT ENGINEER
J. F. MELLO	BS(AE) 1952	AERODYNAMICIST
I. R. MITCHELL	BS(GE) 1930	SPECIFICATION ANALYST
G. P. KERNS	BS(EE) 1953	DEVELOPMENT ENGINEER

EXECUTIVE STAFF:

J. S. McDONNELL	MS(AE) 1925	PRESIDENT
J. F. ALDRIDGE	MS(AE) 1939	VICE-PRESIDENT
W. F. BURKE	BS(AE) 1925	ASST. FACTORY MGR.
A. P. WILKS		PLANT ENGINEER

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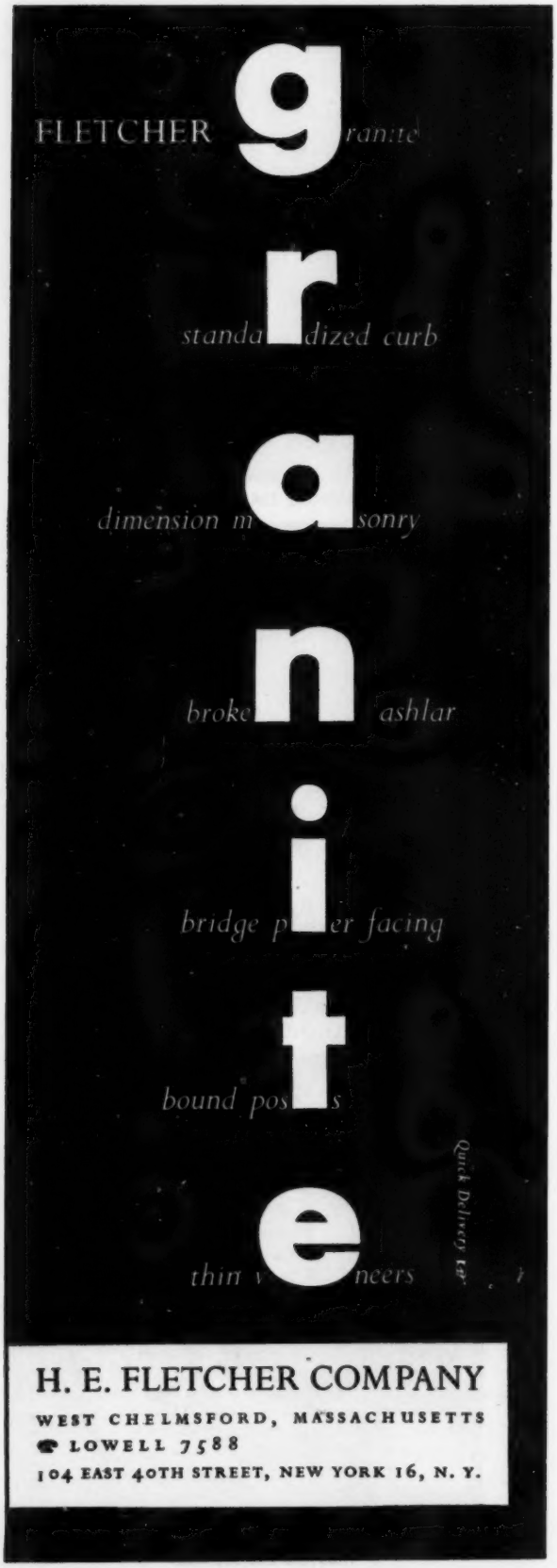


THE INSTITUTE GAZETTE

(*Concluded from page 528*)

John R. Schrieffer, '53, University of Manchester, England.

Lloyd H. Siegal, G., Polytechnic Institute of Milan, Italy.

Richard R. Soderlind, G., Royal Academy of Fine Arts, Denmark.

Bernard P. Spring, G., Helsinki Institute of Technology, Finland.

Karl Zane Yost, '53, University of Florence, Italy.

These Fulbright Scholarships will be effective during the academic year 1953–1954.

The award is made by the Department of State under the provision of Public Law 584 (79th Congress), the Fulbright Act. It is one of approximately 900 grants for study abroad in the academic year 1953–1954 under the United States Educational Exchange Program. As provided by the Act, all students are selected by the board of Foreign Scholarships, the members of which are appointed by the President. Students are recommended by the campus Fulbright committees and by the Institute of International Education.

Funds used under the Fulbright Act are foreign currencies obtained through surplus property sales abroad. Under executive agreements with the foreign governments, exchange programs are being carried out for the academic year 1953–1954 with the following 25 countries: Australia, Austria, Belgium, Burma, Denmark, Egypt, Finland, France, Germany, Greece, India, Iran, Iraq, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Pakistan, Philippines, Thailand, Turkey, the Union of South Africa, and the United Kingdom. A program is planned next year for Sweden and Ceylon.

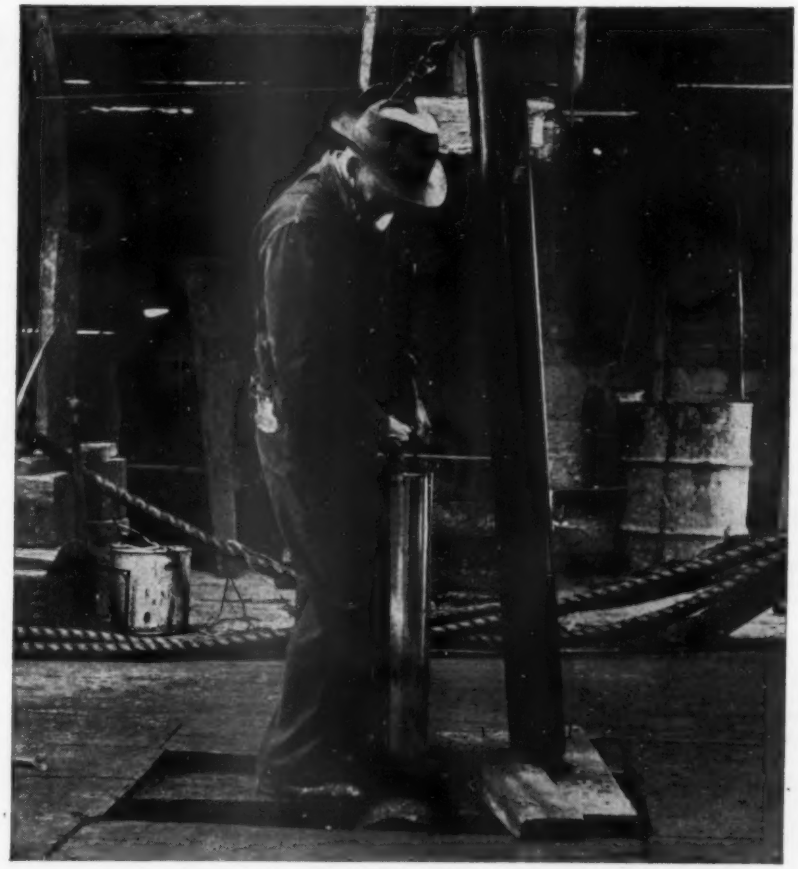
The United States Educational Exchange Program is designed to promote a better understanding of the United States in other countries, and to increase mutual understanding between the people of the United States and the people of other countries. The Program also provides opportunities for foreign nationals to study in American colleges and universities, and for an exchange of teachers, lecturers, and specialists between the United States and more than 70 foreign countries.

Modern Highway Conference

NEARLY 200 highway and public works engineers and planners from 16 states and the District of Columbia registered at the Institute on June 23 for a three-day conference on the planning, surveying and designing of modern highways.

John B. Wilbur, Head of the Department of Civil and Sanitary Engineering at M.I.T., and John A. Volpe, Commissioner, Massachusetts Department of Public Works, welcomed the registrants to the conference which was sponsored by the Departments of Civil and Sanitary Engineering and of City and Regional Planning at M.I.T. and by the Massachusetts Department of Public Works.

At the Other End—TNT



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DANIEL S. KARP '40

DEMOCRACY IS NOT ENOUGH

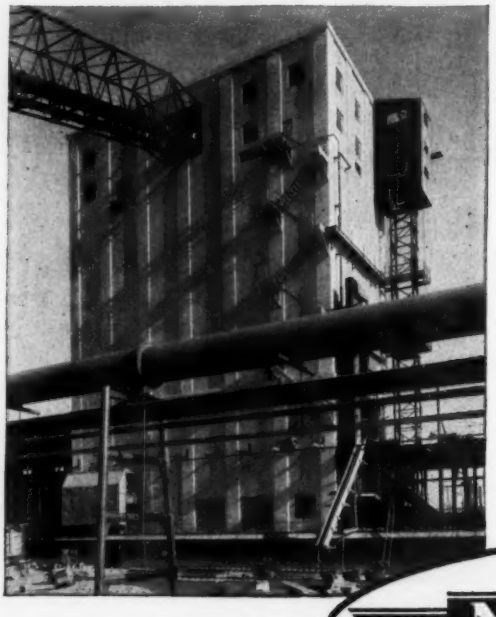
(*Concluded from page* 488)

will or whim, providing that the ends they have in mind are achieved.

If there be no such Absolute back of life, they can justify themselves in using any means at their disposal to attain their own ends, to secure control of people and power for their own purpose; and those who are able, are justified in taking control of the supreme powers of life and death, as well as of the control and the manipulation of the affairs of human lives for paltry ends. It is such control that the democratic-destroying forces would always seize. But the people of a democracy always fight against letting the state seize any such control. For there constantly arises the religious insight that behind life stands God, and all life is finally answerable to Him and to Him alone. Therefore, in the end, to Him should go our supreme allegiance and our loyalty. Until men see and acknowledge this, democracy will always be in deadly peril.

Thus it is not enough that we reject the way of our enemies, we must answer them positively here and on the world scene. And that positive answer should be to affirm in deed and in philosophy our Great Idea, the conviction about man and his infinite worth, about life's purpose and about man's God-given rights, beliefs upon which our democracy must always rest. And these convictions can bring us and our fellows into the most creative revolutionary period our humankind has ever known.

Democracy, by itself, is not enough.



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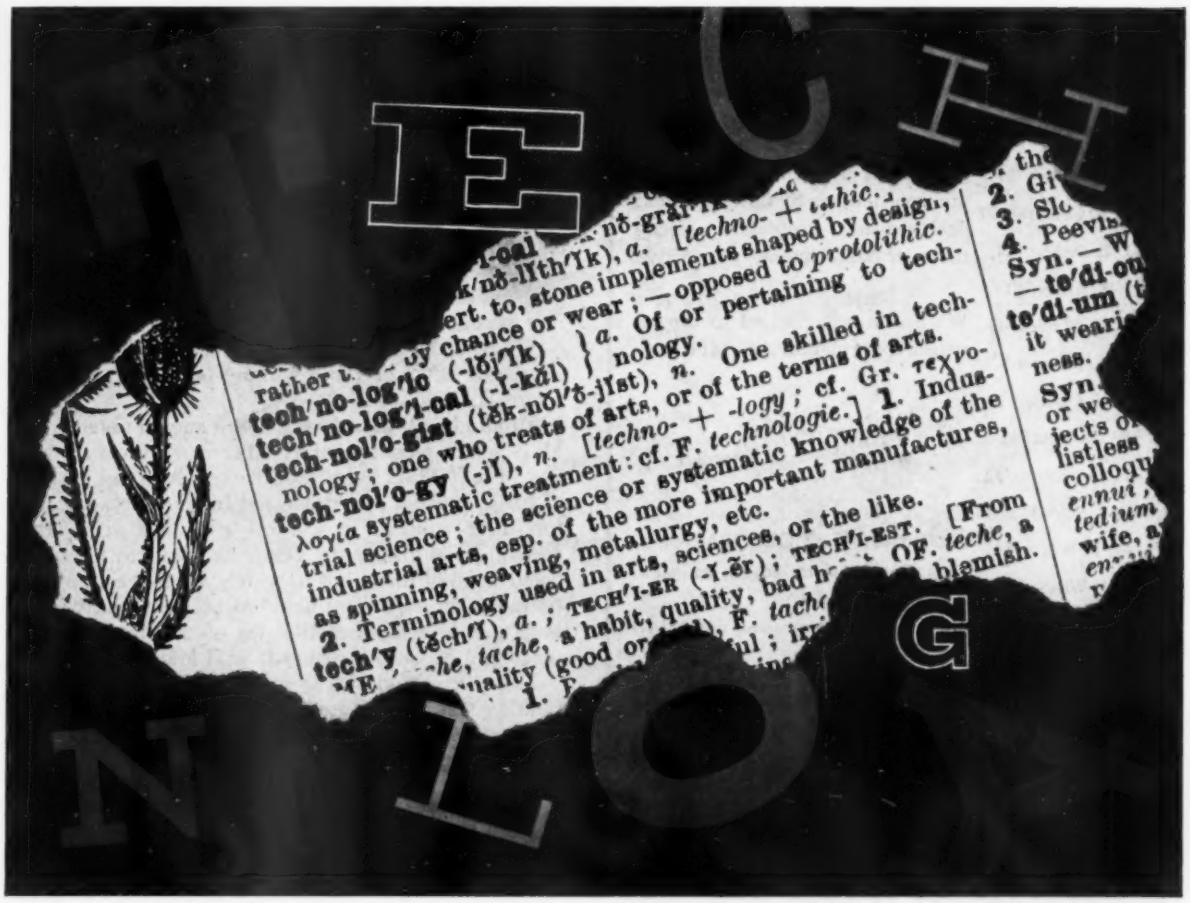

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TREND OF AFFAIRS

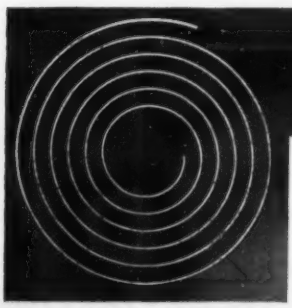
(*Concluded from page 484*)

For some time MSG has been widely used to season commercially packed foods, such as soups, sauces, stews, and vegetable juices. MSG is generally conceded to improve the flavor of such comestibles, but the question is, how? Some pronouncements on this subject have been couched in the florid prose of gastronomy, and have bordered on metaphysics. Thus MSG is stated to "blend and round out" food flavors – whatever that means. MSG is also said to suppress certain undesirable flavors, such as overcooked tastes in foods held overlong in steam tables, or an unpleasant sharpness in onion. But at least one objective fact seems clear; MSG is truly a seasoning, not a condiment. That is to say, it enhances the over-all combined flavor of a dish without presenting any distinguishable flavor of its own.

Although still more needs to be known about *how* MSG works, recently published research gives an inkling of *why* MSG helps food flavors. A broad variety of fresh, cooked, and processed foods were analyzed for their content of natural glutamic acid – the equivalent of glutamate. Glutamic acid was found to occur in all of them, but in widely varying concentrations. Mushrooms were noted to be particularly high in glutamic acid; and the use of mushrooms as a seasoning in various dishes is well known.

Moreover – and this is the striking point – a correlation was found to exist between the goodness of flavor of a given food and its glutamic acid concentration. For example, young fresh flavorsome vegetables had a higher glutamic acid content than did the same vegetables after storage in a refrigerator, when they had also lost some of their flavor. Thus it becomes reasonable to postulate that MSG represents, or simulates, a flavor principle naturally present in foods. Adding MSG to prepared foods may serve to replace something that has been degraded by storage, cooking, or processing.

After extended use by commercial food processors, MSG is now appearing in grocery stores, where it is offered to the housewife under several trade names. This continuing and broadening use of MSG in the American dietary may be expected to maintain interest in studies of its mechanism of action, so that in time its aura of mystery should fade away.



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OUR UNIVERSITIES — A BASTION FOR AMERICA

(*Concluded from page 490*)

I do not suggest that present-day concepts and practices of the university cannot be improved. They can, and I believe that the challenge of the present crises is leading to improvement. There are opportunities for the governing bodies of our educational institutions to develop better teamwork by strengthening the concept of a society of scholars – students, faculty, administrators, trustees – working together for a common ideal. Faculties can improve their procedures for ridding themselves of their unfit and for attracting to themselves the superbly fit. Trustees can encourage faculties to accept and discharge their proper responsibility for maintaining standards and self-discipline; and for speaking up, when necessary, in institutional defense as well as in self-defense. All parts of the institution need to share the responsibility for maintaining the good name of the institution and for underwriting that good name.

At M.I.T. we have gone a long way in attaining these goals, as shown by the response of our academic community to the investigations of several months ago. Since it is the prerogative of the college president to extoll the virtues of his own institution, let me say with pride that the unity, teamwork, and unflinching public responsibility demonstrated by M.I.T. Corporation and Faculty this past year have helped to strengthen the university concept in America. And this institute of technology has given a demonstration of the liberal arts and humanities in action which is more effective than any course of instruction could ever be. Let no one say that science and technology do not embrace the ancient liberal virtues of courage, candor, loyalty, justice, and a deep sympathy for the dignity and sacredness of the individual. To witness and to share in this academic team play has been for me a liberal education and a deeply felt experience, as I am sure it has for many others.

All these things need to be said and understood if we are going to stress how much we have reason for pride and confidence in our institutions. By the same token that we build up America by building up Americans, we must enrich our creative intellectual life, not by abusing but by building up our scholars. If our universities flourish as the seedbeds of the nation's ideas and ideals, the future of the nation is more certain. If our universities become weak and servile, then our society will have lost its marrow and its spirit and itself becomes servile.

There can be no more apt or happy illustration of the meaning and the glory of education in America than what we have witnessed here today in this graduated class from the four corners of the globe. There can be no greater assurance of the power and promise of education than the young men and women we salute today and proudly send on their way. There can be no better demonstration of building up educated men to build up the world.

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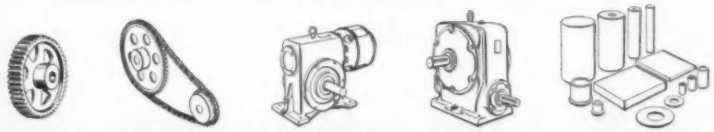

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ALUMNI DAY

(*Continued from page 506*)

associated with the Institute. Dr. Bush's address was devoted primarily to recent changes in the field of electrical engineering. He pointed out that the engineer has a dual role; he must deal with the applications of science and must be particularly alert to the demands of economics. But the engineer must also be competent to deal with human relations. Since World War II there has been a burst of activity in science, research, and manufacturing which provides a very great stimulus in all fields of electrical engineering but which is particularly strong in the branches of communications, electronics, servomechanisms, and information processes. Much of the recent activity in these fields has been stimulated by government procurement for defense, and a cutback in this activity may be anticipated; but the recent changes in electrical engineering have expanded the field horizontally and have resulted in a great diversification of effort.

Professor Brown presented a résumé of progress that had taken place in the Department, particularly within the last year. Two effects dominate the present administration of the Department: (1) Electrical engineering is much more scientific than it was a decade ago and the time interval between conception of new ideas and its application has been drastically reduced; (2) In setting up new courses for the Department of Electrical Engineering, the full benefits of the M.I.T. environment have been effectively utilized with the result that "a good deal of water has been wrung out of the curriculum, especially that of the cook book type"; (3) Professor Ernst A. Guillemin, '24, has recently revised the sophomore program to place greater emphasis on scientific fundamentals, and the previous practice of offering professional options has been eliminated. In making the revision, attempts have been made to find basic motivation which provides opportunity for the nonconformist. Accordingly the curriculum at present aims to train students to fulfill man's desire to process intelligence and his desire to develop the exploitation of energy for the sake of having available a greater amount of energy. The new course calls attention to the fact that materials are useful primarily to create electromag-

(*Continued on page 540*)

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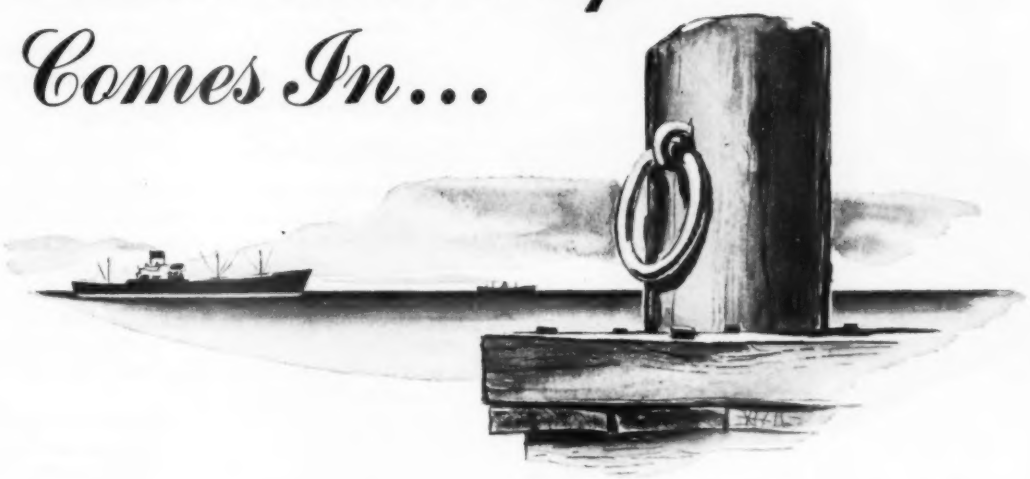

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ALUMNI DAY

(*Continued from page 538*)

netic fields. There is a need to awaken in all engineering students the same opportunities for individual incentive which electronics is able to supply. A major change is being made in the Machinery Laboratory in which large machines will ultimately be replaced with units of greater diversification.

Finally Dean Cochrane summarized the addresses of the dedication, and declared the laboratories open for inspection by visitors.

Alumni Day Luncheon

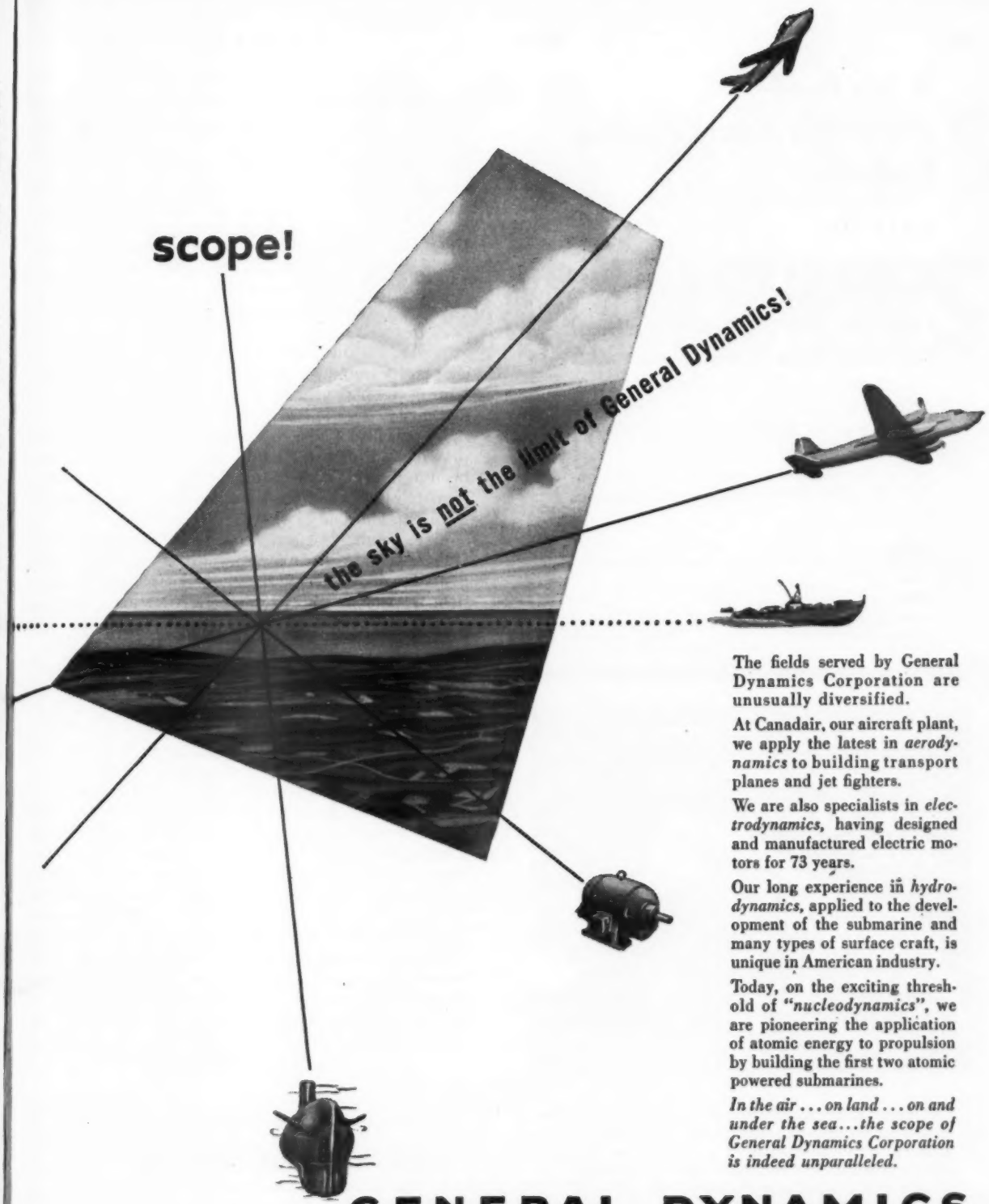
With a circus tent in the Great Court housing members of the 50-year Class, members of the Corporation and distinguished guests, approximately 1,200 Alumni and their friends gathered in Du Pont Court for the buffet-style luncheon on Alumni Day. After this informal event, James R. Killian, Jr., '26, resumed his practice of the past two years by delivering his annual report to Alumni at the luncheon, instead of at the Stein-on-the-Table Banquet.

The post-luncheon activities were opened by Edwin D. Ryer, '20, President of the Alumni Association, who read a resolution adopted by the Executive Committee of the Alumni Association in support of the stand taken by the Administration in dealing with the investigations of M.I.T. Faculty members by the House Un-American Activities Committee. The statement read by Mr. Ryer is as follows:

> The Executive Committee of the Alumni Association has directed me to express to you on this occasion our whole-hearted support of the position taken by the Institute's Administration and Faculty with respect to the recent Congressional investigations.
>
> We know that the Massachusetts Institute of Technology stands unequivocally opposed to Communism.
>
> We subscribe to your stand that a member of our Faculty "must be diligent and loyal in citizenship and that he must teach in the clear light without hidden allegiance or obligations which require him to distort his research or teaching in accord with dictates from without."
>
> We feel it equally important that this policy be administered fairly and unemotionally; and we are confident that this has been done in the cases of the three members of our Faculty who testified freely and cooperatively before the House Un-American Activities Committee, and who have been continued at the Institute without impairment of their official status.

In presenting his report to Alumni, following Mr. Ryer, President Killian expressed his thanks for the resolution. He also pointed out that during the last year members of the Institute's Faculty and Administration had to stand a good deal, but they stood for very much and they stood together. He reported that on Commencement Day, June 12, approximately 1,000 new members of the Class of 1953 have been admitted to the membership of the Alumni Association, of which one third to one half will shortly be inducted into military service. Those not entering military service have been offered more employment opportunities than ever before in the history of the Institute.

(*Continued on page 542*)



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ALUMNI DAY

(Continued from page 540)

President Killian took obvious pleasure in relating the many ways in which the student body engaged in cultural and educational activities outside of the classroom. Many have taken a more or less serious interest in painting, religion, music, or the manual hobbies – all of which contribute to individual development. To a greater extent than ever before, freshmen and Faculty have come together in informal discussion groups – one of the most successful of which discussed problems of modern physics at the homes of Faculty members. Individual development has also been fostered by the fact that classes at the Institute are relatively small. The lecture sessions in freshman classes, for example, do not exceed 25 or 30 students. During the past year 40 Faculty members have each elected to serve as advisers to 25 freshmen. In thus devoting effort to the counseling of new students, the primary aim of the Faculty and Administration has been to develop concern for the intellectual digestive process rather than for the quantity of material fed to the students.

Five members of the Institute staff have received Guggenheim Awards for the next year, and 17 students have received Fulbright scholarships. In addition, 63 persons who have received National Science Foundation Fellowships have elected to take their fellowship studies at M.I.T.

The student aid program, under the direction of Thomas P. Pitré, Associate Dean of Students, and with the assistance of William H. Carlisle, Jr., '28, Manager of Student Personnel, has enabled more than 1,200 students to engage in part-time work during the past year. During the year the amount of graduate scholarships was increased by about 40 per cent, and the number of students to whom scholarships were awarded was increased by about 15 per cent. In its scholarship activities, the Institute has enjoyed unusual success in the 12-month program of the Sloan Scholarships. The Technology Loan fund, established by Gerard Swope, '95, about 1930, has loaned more than $2,250,000 to more than 3,600 students during its existence. During the past year $215,000 has been loaned at an interest rate of 1 per cent. Income from interest has been more than adequate to compensate for the small loss through deaths and bad debts, so that the fund continues to grow slowly. The principal

(Continued on page 544)

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ALUMNI DAY

(*Continued from page 542*)

and income from this fund are perpetually available and are freely used by those students who are anxious to invest in their own future.

Under the heading of new construction, President Killian announced that the John Thompson Dorrance Laboratory would be dedicated on June 23, and that construction is already under way for the Kresge Auditorium, as described on page 514 of this issue. The Division of Biochemistry, as already reported in the December, 1952, issue of *The Review*, will begin operations on July 1. Noteworthy medical research is likewise going on at the Institute, particularly in the application of x-rays to cancer. Recent experience shows that three out of every five persons treated at the Institute are now free from any symptons of cancer, even though many came to the campus with advanced stages of this disease.

President Killian announced that, in the School of Industrial Management, the number of Sloan Fellowships for the coming year will be doubled. He also pointed out that student health at the Institute is among the finest of any of the United States colleges, partly because considerable emphasis is placed on the use of techniques of medicine as a preventive means. In conclusion, President Killian outlined the present aims of the Institute in the following seven-point program: (1) There is a need to make student residence

(*Continued on page 546*)

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ALUMNI DAY

(*Continued from page 544*)

more stimulating and invigorating. (2) Every effort should be made to encourage participation in student government so that students may learn to assume greater responsibility for the management of their own activities. (3) Experiments in several fields are under way to increase student enthusiasm for learning and study. (4) The Institute recognizes, and is anxious to increase, those incentives which will assure greater effectiveness of teaching. (5) With the postwar enrollment stabilized at about 5,000 students there appears to be excellent prospect for selecting incoming students on the basis of their ability to benefit most from the type of learning the Institute has to offer. (6) In order to round out its physical facilities, the Institute is looking toward the acquisition of an adequate gymnasium and lecture hall. (7) Among its long-term fiscal objectives, the Institute is looking toward an increase of $20,000,000 over the next five years – of which $3,000,000 has already been received during the past year.

Dedication of World War II Memorial

At 3:00 P.M. in the lobby of Building 10, Professor John T. Rule, '21, Raymond A. St. Laurent, '21, and Dr. Compton took part in brief ceremonies for the dedication of the World War II Memorial. The names of M.I.T. Alumni who made the supreme sacrifice between the years 1941-1945 have been engraved on the north wall in the lobby of Building 10 as a gift of the Class of 1921, as illustrated on page 480.

President's Reception

At 4:00 P.M. several hundred Alumni found their way to the President's House where they were guests of President and Mrs. Killian at a reception and garden party.

Ladies' Banquet

While Technology Alumni were partaking of one of their annual Stein-on-the-Table Banquets, the wives were enjoying their own banquet in private dining rooms not far away. In addition to honored guests at the head table, 12 round tables (with a hostess for each table) accommodated the ladies.

Mrs. John B. Wilbur, chairman of the Ladies' Events, introduced those at the head table, and Mrs.

(*Continued on page 548*)

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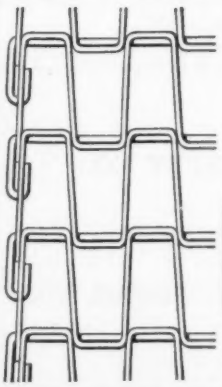

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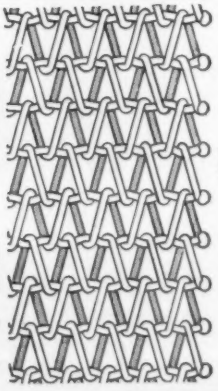

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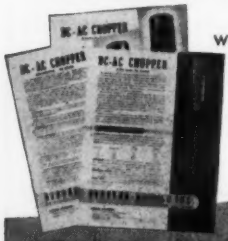

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ALUMNI DAY

(*Continued from page 546*)

James R. Killian, Jr., in her informal and friendly fashion introduced Miss Julia M. Comstock, Mrs. Nathaniel McL. Sage, '13, Mrs. Stanley McCormick, '04, Miss Emilie Drew, '56, Mrs. Thomas B. Drew, Mrs. James Donovan, and Mrs. Ralph T. Jope.

Mrs. Elspeth D. Rostow, Assistant Professor of History at M.I.T., spoke on the subject, "Sophomores, Slide Rules, and Sophocles" – a topic described by those who heard the address as "like a mysterious delectable-looking *hors d'oeuvre*." Professor Rostow's talk gave her impressions of Technology from the point of view of the first woman professor the Institute has ever had. Professor Rostow identified the students with the sophomores of her address, the Faculty with slide rules, and the current humanities program at M.I.T. with her subject of Sophocles. Space is not available for a full report of this address but the concluding paragraph hints at the tone of this unusual address:

There you have my eclectic impressions of M.I.T. A serious and argumentative student body; a talented and responsible Faculty; and the beginning of significant new trends in engineering education. When you add to this the factors that I haven't discussed . . . an able and distinguished alumni body, a highly competent administration, and a Corporation of discernment . . . you'll understand why I think the place is in pretty good shape. So if anyone should ask you the reason your husband went to M.I.T., just shrug your shoulders with womanly wisdom and reply, "Where *else* would a good man go?"

Stein-on-the-Table Banquet

Promptly at seven o'clock, while the ladies gathered for their own banquet in Parlors B and C of the Hotel Statler, Technology Alumni congregated in the ballroom of the Hotel Statler for their annual Stein-on-the-Table Banquet. Under the leadership of Orville B. Denison, '11, and to the accompaniment of Harry U. Camp, '18, Tech songs rang out loud and clear throughout the evening. To add to the festivity, at each dinner guest's place was a Technology stein designed by Henry B. Kane, '24.

Following the banquet, at which Edwin D. Ryer, '20, President of the Alumni Association, presided, guests at the head table were introduced as well as Alumni from distant places of the world. Mr. Ryer then called upon George W. McCreery, '19, chairman

(*Concluded on page 550*)

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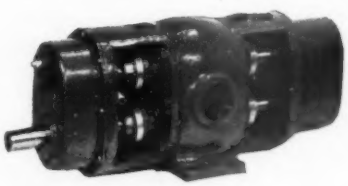

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ALUMNI DAY

(*Concluded from page 548*)

of Alumni Day, to conduct Wallace M. Ross to the platform to receive a certificate as an honorary member of the M.I.T. Alumni Association, in recognition of his 34 years of service as General Secretary of the Technology Christian Association.

For the Class of 1928, Ralph T. Jope, Class President, presented to Karl T. Compton, chairman of the Corporation, a check for $85,790 – of which $10,000 is to be used for research, and $75,790 for the establishment of the Class of 1928 Endowment Fund, the first Class Endowment Fund with income only to be used for general purposes. In making this announcement, Mr. Jope also took obvious pride in announcing that total contributions from his Class, since their graduation one quarter century ago, amounted to $191,043. For the 50-year Class, Frederic A. Eustis, '03, Secretary, presented the class gift of $25,950, and announced that their total gifts since 1903 amounted to $75,383. On behalf of the Corporation Dr. Compton graciously accepted both gifts.

President Ryer then called on Dr. Killian who made a short address in introducing Erwin D. Canham, editor of the *Christian Science Monitor*. Mr. Canham's banquet address, "The Chances for Peace," appears on page 495, of this issue of *The Review*.

As final event of the evening, Mr. Ryer introduced Horatio L. Bond, '23, who will serve as president of the Alumni Association for the year beginning July 1, 1953. After a few words of appreciation from Mr. Bond, for his election to this high office, and the singing of one or two songs, the meeting was adjourned at 9:30 P.M.

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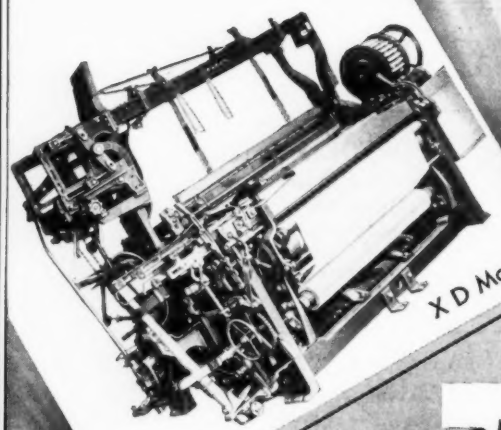

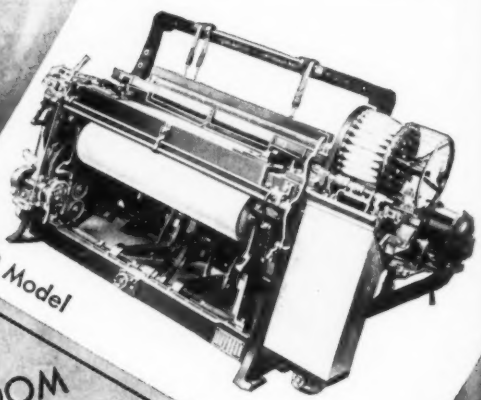

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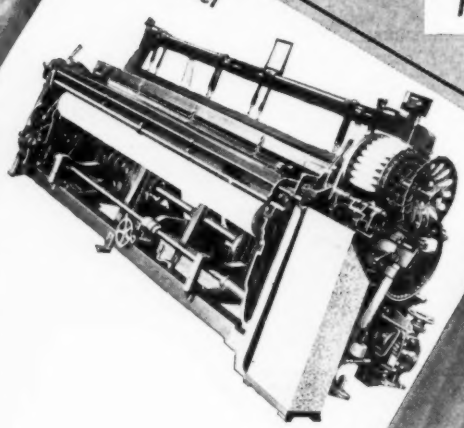

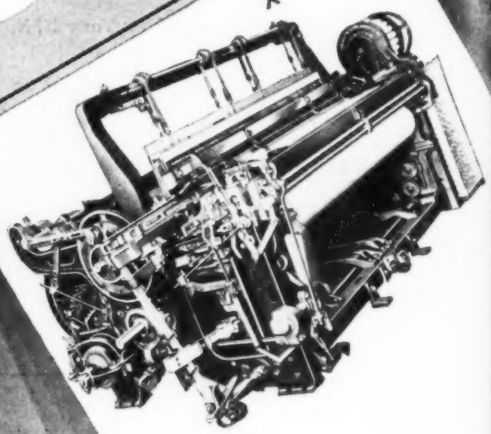

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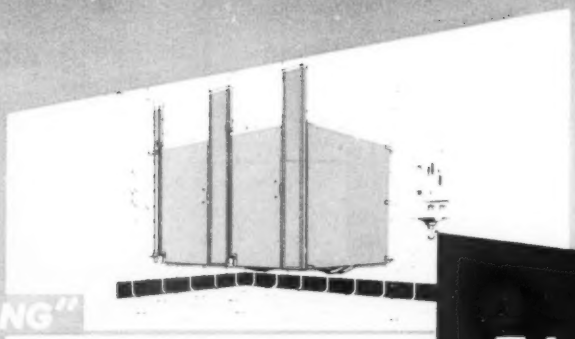

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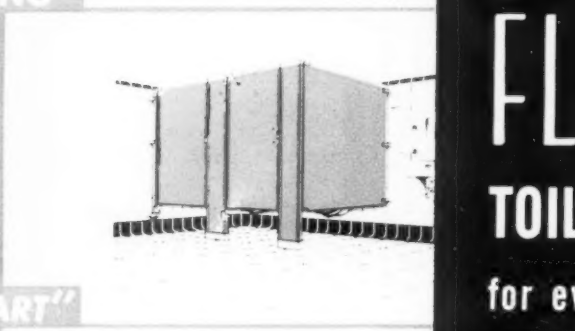

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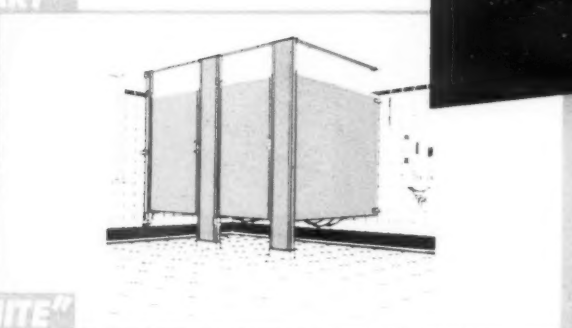

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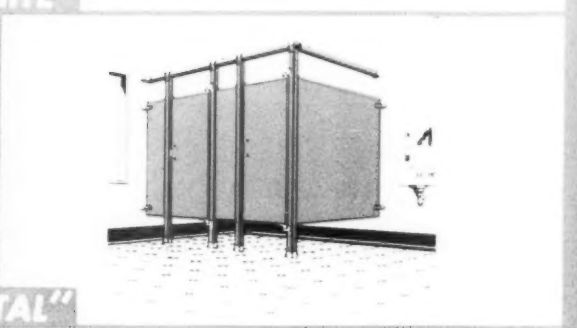

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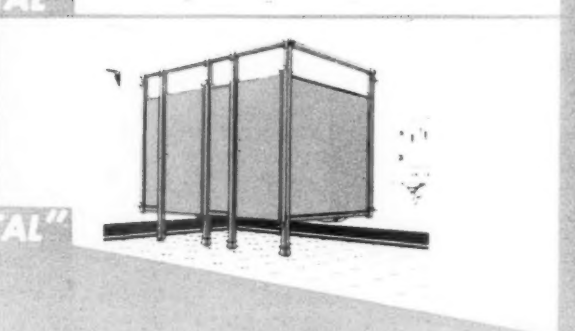

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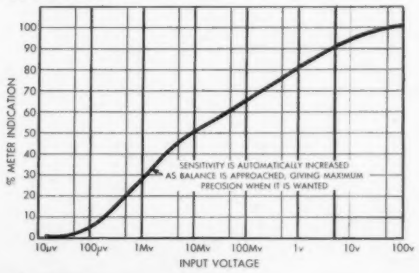
New WIDE BAND NULL DETECTOR

for Bridge Measurements from 20 to 5,000,000 cycles

The NEW G-R Null Detector is an extremely sensitive instrument designed for maximum convenience and utility in bridge measurements. This moderately-priced unit has a wide band, logarithmic amplifier with a gain of 70 db. The frequency characteristic is flat within 1 db from 50 cycles to 500 kc making the instrument useful as a voltage indicator over a wide range.

A logarithmic amplifier eliminates switching of attenuators—with this Null Detector the approach to balance is continuously and accurately indicated. The instrument will detect as low as 15 microvolts, yet more than 100 volts is required to drive the needle off scale. The combination of high sensitivity at low input levels and a full-scale deflection of 100 volts gives the user an on-scale range of 120 db.



Sensitivity — *less than 40 microvolts input at 1 kc required to deflect 1% of full scale*

Head Telephones — *terminals for head telephones provide approximately 20 db additional sensitivity*

Tubes — *three Type 6AK5, one Type 12AX7 and one Type OA2, all supplied with instrument*

Dimensions — *(Width) 14½ x (Height) 5⅜ x (Depth) 6 inches with power supply attached*

Net Weight — *10¾ pounds, instrument and power supply*

Type 1203-A Unit Power Supply ... $47.50
Recommended for use with the Type 1212-A Unit Null Detector.
This unit supplies up to 50 ma at 300 volts dc and 3 amps at 6.3 volts ac.

Type 1212-A Unit Null Detector $160.00
New compact instrument with high sensitivity and wide frequency range.

The two instruments may be bolted together for permanent use, or plugged together temporarily.

Extraneous signals and noise are sometimes bothersome when a detector of 40 μv sensitivity and 5 Mc bandwidth is used. It is therefore often desirable to use a filter tuned to the generator frequency to obtain maximum precision.

For exceptional performance at either 400 or 1,000 cycles, the Type 1951-A Filter is recommended. The Type 1212-P1 High-Pass Filter eliminates low frequency noise and hum and is intended for work above 10 kc.

Type 1951-A Filter (400 and 1000 cycle) $65.00
Type 1212-P1 High-Pass Filter (passes 10 kc and above) 12.00

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